



DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R1–ES–2020–0076; FF09E21000 FXES11110900000 212]

RIN 1018–BE71

Endangered and Threatened Wildlife and Plants; Threatened Species Status for Mount Rainier White-tailed Ptarmigan with a Section 4(d) Rule

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to list the Mount Rainier white-tailed ptarmigan (*Lagopus leucura rainierensis*), a bird subspecies in Washington, as a threatened species under the Endangered Species Act of 1973, as amended (Act). After a review of the best available scientific and commercial information, we find that listing the subspecies is warranted. Accordingly, we propose to list the Mount Rainier white-tailed ptarmigan as a threatened species with a rule issued under section 4(d) of the Act (“4(d) rule”). If we finalize this rule as proposed, it would add this subspecies to the List of Endangered and Threatened Wildlife and extend the Act’s protections to the species. We have determined that designation of critical habitat for this subspecies is not prudent.

DATES: We will accept comments received or postmarked on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

Comments submitted electronically using the Federal eRulemaking Portal (see

ADDRESSES, below) must be received by 11:59 p.m. Eastern Time on the closing date.

We must receive requests for public hearings, in writing, at the address shown in **FOR**

FURTHER INFORMATION CONTACT by [INSERT DATE 45 DAYS AFTER
DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may submit comments by one of the following methods:

(1) *Electronically:* Go to the Federal eRulemaking Portal:

<http://www.regulations.gov>. In the Search box, enter FWS–R1–ES–2020–0076, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, in the Search panel on the left side of the screen, under the Document Type heading, check the Proposed Rule box to locate this document. You may submit a comment by clicking on “Comment Now!”

(2) *By hard copy:* Submit by U.S. mail to: Public Comments Processing, Attn: FWS–R1–ES–2020–0076, U.S. Fish and Wildlife Service, MS: PRB/3W, 5275 Leesburg Pike, Falls Church, VA 22041–3803.

We request that you send comments only by the methods described above. We will post all comments on <http://www.regulations.gov>. This generally means that we will post any personal information you provide us (see **Information Requested**, below, for more information).

FOR FURTHER INFORMATION CONTACT: Brad Thompson, State Supervisor, U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, 510 Desmond Drive, Suite 102, Lacey, WA 98503; telephone 360–753–9440. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, if we determine that a species is an endangered or threatened species throughout all or a significant portion of its range, we are required to promptly publish a proposal in the *Federal Register* and make a

determination on our proposal within 1 year. To the maximum extent prudent and determinable, we must designate critical habitat for any species that we determine to be an endangered or threatened species under the Act. Listing a species as an endangered or threatened species and designation of critical habitat can only be completed by issuing a rule.

What this document does. We propose the listing of the Mount Rainier white-tailed ptarmigan (*Lagopus leucura rainierensis*) as a threatened species with a rule issued under section 4(d) of the Act.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species because of any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

We have determined that habitat degradation resulting from climate change will affect the Mount Rainier white-tailed ptarmigan within the foreseeable future. Rising temperatures associated with climate change are expected to have direct and rapid impacts on individual birds, which experience physiological stress at 21 degrees Celsius (C) (70 degrees Fahrenheit (F)). Changing habitat conditions, such as loss of suitable alpine vegetation and reduced snow quality and quantity, are expected to cause populations to decline. These threats and responses are reasonably foreseeable because some are already evident in the range of the subspecies, and the best available information indicates that the effects of climate change will continue to alter the subspecies' habitat within the foreseeable future. Furthermore, connectivity between populations is low, and it is unlikely that Mount Rainier white-tailed ptarmigan will adapt

to the changing climate by moving northward because alpine areas north of their current range are expected to undergo similar impacts due to climate change.

Section 4(a)(3) of the Act requires the Secretary of the Interior (Secretary) to designate critical habitat concurrent with listing to the maximum extent prudent and determinable. We find that threats to Mount Rainier white-tailed ptarmigan habitat stem solely from causes that cannot be addressed through management actions resulting from consultations on these species under section 7(a)(2) of the Act. Therefore, we have determined that designation of critical habitat for this subspecies is not prudent.

Peer review. In accordance with our joint policy on peer review published in the *Federal Register* on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review of listing actions under the Act, we sought the expert opinions of eight independent peer reviewers, including scientists with expertise in white-tailed ptarmigan as well as climate science on the Mount Rainier white-tailed ptarmigan Species Status Assessment, Version 1.1 (SSA report) (USFWS 2020, entire), which provided the scientific basis for this proposed rule; three of these experts provided review. The purpose of peer review is to ensure that our listing determinations, critical habitat designations, and 4(d) rules are based on scientifically sound data, assumptions, and analyses. The Service also sent the SSA report to three agency partners for review; we received comments from one agency—the Washington Department of Fish and Wildlife.

The proposed section 4(d) rule. We propose to prohibit all intentional take of the Mount Rainier white-tailed ptarmigan and specifically tailor the incidental take exceptions under section 9(a)(1) of the Act. This is to provide protective mechanisms primarily to the U.S. Forest Service (USFS) and the National Park Service (NPS) to continue routine operations on the landscape that are not likely to cause adverse effects

and, in some cases, have the potential to benefit the Mount Rainier white-tailed ptarmigan over time.

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from other concerned governmental agencies, Native American Tribes, the scientific community, industry, or any other interested parties concerning this proposed rule.

We particularly seek comments concerning:

(1) The species' biology, range, and population trends, including:

(a) Biological or ecological requirements of the species, including habitat requirements for feeding, breeding, and sheltering;

(b) Genetics;

(c) Taxonomy and the validity of the current subspecies classification;

(d) Historical and current range including distribution patterns;

(e) Historical and current population levels, and current and projected trends; and

(f) Past and ongoing conservation measures for the species, its habitat or both.

(2) Factors that may affect the continued existence of the species, which may include habitat modification or destruction, overutilization, disease, predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors.

(3) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to this species and existing regulations that may be addressing those threats.

(4) Additional information concerning the historical and current status, range, distribution, and population size of this species, including the locations of any additional populations of this species.

(5) Information on regulations that are necessary and advisable to provide for the conservation of the Mount Rainier white-tailed ptarmigan and that the Service can consider in developing a 4(d) rule for the species. In particular, information concerning the extent to which we should include any of the section 9 prohibitions in the 4(d) rule or whether any other forms of take should be excepted from the prohibitions in the 4(d) rule.

(6) The reasons why we should or should not designate habitat as “critical habitat” under section 4 of the Act (16 U.S.C. 1531 *et seq.*), including information to inform the following factors that the regulations identify as reasons why designation of critical habitat may or may not be prudent:

(a) The species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat to the species;

(b) The present or threatened destruction, modification, or curtailment of a species’ habitat or range is not a threat to the species, or threats to the species’ habitat stem solely from causes that cannot be addressed through management actions resulting from consultations under section 7(a)(2) of the Act;

(c) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States; or

(d) No areas meet the definition of critical habitat.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include.

Please note that submissions merely stating support for, or opposition to, the action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act directs

that determinations as to whether any species is an endangered or a threatened species must be made “solely on the basis of the best scientific and commercial data available.”

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**.

Comments and materials we receive, including all hardcopy submissions as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on <http://www.regulations.gov>. If you submit information via <http://www.regulations.gov>, your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so.

Because we will consider all comments and information we receive during the comment period, our final determinations may differ from this proposal. Based on the new information we receive (and any comments on that new information), we may conclude that the species is endangered instead of threatened, or we may conclude that the species does not warrant listing as either an endangered species or a threatened species. In addition, we may change the parameters of the prohibitions or the exceptions to those prohibitions if we conclude it is appropriate in light of comments and new information received. For example, we may expand the incidental-take prohibitions to include prohibiting additional activities if we conclude that those additional activities are not compatible with conservation of the species. Conversely, we may establish additional exceptions to the incidental-take prohibitions in the final rule if we conclude that the activities would facilitate or are compatible with the conservation and recovery of the species.

Public Hearing

Section 4(b)(5) of the Act provides for a public hearing on this proposal, if requested. Requests must be received by the date specified in **DATES**. Such requests must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule a public hearing on this proposal, if requested, and announce the date, time, and place of the hearing, as well as how to obtain reasonable accommodations, in the *Federal Register* and local newspapers at least 15 days before the hearing. For the immediate future, we will provide these public hearings using webinars that will be announced on the Service's website, in addition to the *Federal Register*. The use of these virtual public hearings is consistent with our regulations at 50 CFR 424.16(c)(3).

Previous Federal Actions

In 2010, the Service was petitioned to list the southern white-tailed ptarmigan (*Lagopus leucura altipetens*) and the Mount Rainier white-tailed ptarmigan as threatened species under the Act. In 2012, the Service issued a positive 90-day finding on the petition to list the two subspecies, having determined that the petition presented substantial scientific or commercial information indicating that listing the southern white-tailed ptarmigan and the Mount Rainier white-tailed ptarmigan may be warranted. The Service then conducted separate status reviews on the two subspecies.

Supporting Documents

A team of Service biologists, in consultation with other species experts, developed the SSA report for the Mount Rainier white-tailed ptarmigan (USFWS 2020, entire). The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species. The Service sent the report to eight independent peer reviewers and received three responses. The Service also sent the SSA report to three agency partners for review; we received comments from

one agency—the Washington Department of Fish and Wildlife. This proposed rule is based on the scientific information compiled in the SSA report, and constitutes our 12-month finding on the 2010 petition to list the Mount Rainier white-tailed ptarmigan.

I. Proposed Listing Determination

Background

A thorough review of the taxonomy, life history, and ecology of the Mount Rainier white-tailed ptarmigan is presented in the SSA report (USFWS 2020, entire). The Mount Rainier white-tailed ptarmigan is found in alpine and subalpine areas of the Cascade Mountains (Cascades) in Washington State and southern British Columbia, Canada. There are currently four other subspecies of white-tailed ptarmigan recognized, including the southern white-tailed ptarmigan (*L. l. altipetens*) primarily in Colorado, the Kenai white-tailed ptarmigan (*L. l. peninsularis*) in Alaska, the Vancouver Island white-tailed ptarmigan (*L. l. saxatilis*) in British Columbia, Canada, and the northern white-tailed ptarmigan (*L. l. leucura*) in northern Montana and Alberta, Canada.

Species Description

Mount Rainier white-tailed ptarmigan are cryptic birds that are resident or short-distance elevation migrants with numerous adaptations for snow and extreme cold in winter, including snow roosting behavior and heavily feathered feet that act as snowshoes to support them as they walk across the snow (Braun et al. 2011, Distinguishing Characteristics section). The subspecies molts frequently throughout the year to remain cryptic, appearing entirely white in winter (except for black eyes, dark toenails, and a black beak), mottled with brown and white in spring, and brown in summer; the tail feathers remain white year-round and distinguish the white-tailed ptarmigan from other ptarmigan species (Braun et al. 2011, Distinguishing Characteristics section; Braun et al. 1993, Appearance section; Hoffman 2006, p. 12). The breeding plumage of male Mount Rainier white-tailed ptarmigan includes dark brown and black breast feathers that

resemble a necklace. Males and females share similar body size and shape, with adult body lengths up to 34 centimeters (cm) (13.4 inches (in)), and body masses up to approximately 378 grams (g) (0.83 pounds (lb)) (Martin et al. 2015, Table 3).

Taxonomy and Genetics

The white-tailed ptarmigan is in the order Galliformes, family Phasianidae, and the subfamily Tetraoninae, which includes multiple grouse species (Hoffman 2006, p. 11; NatureServe 2011, p. 1). Multiple taxonomic authorities for birds recognize the validity of the five subspecies of white-tailed ptarmigan. The American Ornithological Union (AOU) recognized the five subspecies in their Checklist (AOU 1957, entire). Since 1957, the AOU has not conducted a review of its subspecific distinction and stopped listing subspecies as of the 6th edition in 1983. However, the AOU (1998, p. xii) recommends the continued use of its 5th edition (AOU 1957, entire) for taxonomy at the subspecific level. Based on their 1957 consideration of the taxon, the AOU still recognizes the Mount Rainier white-tailed ptarmigan as a valid subspecies. Additionally, the Integrated Taxonomic Information System (ITIS) (2019) and Cornell Lab of Ornithology's Clements Checklist (Clements et al. 2019, entire) also recognize the five subspecies of white-tailed ptarmigan.

Life History

Male Mount Rainier white-tailed ptarmigan establish territories in early spring, extending their territories upslope as snow melts, exposing vegetation and potential nesting sites (Schmidt 1988, pp. 283–284). Pairs form shortly after females arrive on breeding areas in late April to mid-May (Martin et al. 2015, Phenology section). White-tailed ptarmigan are usually monogamous, but polygyny (one male with multiple females) and polyandry (one female with multiple males, a.k.a. extra-pair copulations) also occur on rare occasions (Benson 2002, p. 195; Braun and Rogers 1971, p. 33). Due to the short breeding season, female white-tailed ptarmigan usually nest only once per

season. However, if they lose their nest during the laying period or early incubation, they may lay a second or, rarely, a third clutch of eggs at another site within their territory (Choate 1963, p. 693; Giesen and Braun 1979, p. 217). Regardless, female white-tailed ptarmigan raise only one brood per year (Sandercock et al. 2005a, p. 2177).

First clutches are typically 4–9 eggs, with smaller replacement clutches (2–7 eggs) (Choate 1963, p. 693; Giesen and Braun 1979, p. 217); incubation lasts 22–25 days (Wiebe and Martin 2000, p. 467; Martin et al. 2015, Incubation section). Chicks are precocial, meaning they are relatively mature and mobile from the moment of hatching. Within 6–12 hours after all eggs have hatched, broods gradually move upslope, depending on where forage and cover for chicks are found (Braun 1969, p. 140; Schmidt 1988, p. 291; Giesen and Braun 1993, p. 74; Hoffman 2006, p. 21; Martin et al. 2015, Young Birds section). Chicks are capable of flight at 10–12 days of age, and remain with females for 8–10 weeks, and sometimes through the winter (Martin et al. 2015, Fledgling Stage section).

Chicks less than 3 weeks old primarily eat invertebrates (May 1975, p. 28), but adult white-tailed ptarmigan, as well as chicks older than approximately 5 weeks old, are herbivorous (May 1975, pp. 28–29). White-tailed ptarmigan in the North Cascades were observed eating, in order of preference: dwarf huckleberry (*Vaccinium deliciosum*), red mountain heather (*Phyllodoce empetrifoliosa*), black-headed sedge (*Carex nigricans*), white mountain heather (*Cassiope mertensiana*), crowfoot (*Leutkea pectinata*), Tolmie's saxifrage (*Saxifraga tolmiei*), spiked wood rush (*Luzula spicata*), and mosses (Skagen 1980, p. 4). Plant items in bird's crops consisted of leaves, buds, and catkins of willow (*Salix*); fruit of sedges (*Carex*), grasses (*Poa*), and heather (*Cassiope*); and leaves of buttercup (*Ranunculus*) (Weeden 1967, entire).

Records of longevity for wild white-tailed ptarmigan include a 12-year-old female and a 15-year-old male (Martin et al. 2015, Life Span and Survivorship section).

Breeding season mortality is higher for females than for males (Martin et al. 2015), but is assumed to be highest for both sexes during migration between breeding and wintering areas in the fall and spring (Braun and Rogers 1971). Survival rates change from year to year and among populations, with no consistent trend or pattern (Sandercock et al. 2005b, p. 16; Martin et al. 2015; Life Span and Survivorship section). Juvenile survival of ptarmigan during their first fall and winter is usually lower than adult survival (Choate 1963, Giesen and Braun 1993, and Hannon and Martin 2006, in Martin et al. 2015, Life Span and Survivorship section).

Density estimates have been calculated for other subspecies of white-tailed ptarmigan, but these estimates are uneven across the range of the species, with most studies occurring in Colorado, Vancouver Island, the Yukon, and the Sierra Nevada mountains of California where 72 white-tailed ptarmigan were translocated from Colorado in 1971 and 1972 (Clarke and Johnston 1990, p. 649). These estimates fluctuate between years and locations, ranging from about less than 1 to about 14 birds per km² (2.6 to 36 birds per mi²). There have been no population-scale density estimates for populations in the range of the Mount Rainier subspecies; Mount Rainier white-tailed ptarmigan populations may or may not be within this wide range reported for other subspecies (USFWS 2020, p. 24).

Habitat

Habitat use by white-tailed ptarmigan varies by geographic region and by season. Our understanding of Mount Rainier white-tailed ptarmigan habitat comes primarily from habitat studies on Vancouver Island white-tailed ptarmigan in British Columbia and the introduced population of southern white-tailed ptarmigan in the Sierra Nevada, because these areas have the most similar climates and vegetation to the Cascades in Washington and Southern British Columbia. The Rocky Mountains are less suitable as a habitat surrogate because they are geologically much older, less steep, contain a greater diversity

of plants, and have a much different climate (colder, drier winters, and summers influenced by monsoonal weather from the Gulf of Mexico) (Zwinger and Willard 1972, pp. 119–120; Appendix C of the SSA). Of the surrogate regions for which we have white-tailed ptarmigan habitat information, the Sierra Nevada is most similar to the Cascades due to the deep, wet snow and fragmented alpine areas (Braun 2019, pers. comm). Vancouver Island shares similar vegetation with some parts of the range of the Mount Rainier white-tailed ptarmigan.

Breeding and brood-rearing habitat of Mount Rainier white-tailed ptarmigan is within the alpine zone, defined by treeline at its lower elevation limit and permanent snow or barren rock at its upper elevation limit. The alpine zone is a narrow band of sparsely distributed vegetation, including patches of sedge-turf communities, subshrubs, or krummholz (tree stunted by winds and frost) interspersed between snowfields, talus slopes, and fellfields (Douglas and Bliss 1977, p. 115). In the Sierra Nevada, predominant characteristics of breeding season habitat include areas with cover of dwarf willow (e.g., arctic willow (*Salix anglorum* var. *antiplasta*)), herbs, and mosses; and proximity to water and willow shrubs (Frederick and Gutierrez 1992, p. 895). Ptarmigan habitat on Vancouver Island includes boulder cover, ericaceous (plants in the heather family) shrub cover with tree islands of spruce (*Picea* spp.) or subalpine fir (*Abies lasiocarpa*) distributed throughout, graminoid (grass and sedge) cover, forb cover, and proximity to water (Fedy and Martin 2011, p. 311; (Martin et al. 2004, p. 239). White-tailed ptarmigan in the North Cascades have been found in moist vegetation communities of mountain heather (*Phyllodoce empetriiformis* and *Cassiope mertensiana*), dwarf huckleberry (*Vaccinium deliciosum*), crowfoot (*Leutkea pectinata*), sedge (*Carex nigricans*, *C. spectabilis*), and Tolmie's saxifrage (*Saxifraga tolmiei*) (Skagen 1980, p. 2).

Nest site characteristics have not been described for Mount Rainier white-tailed ptarmigan. Other subspecies of white-tailed ptarmigan construct nests in rocky areas,

meadows, willow thickets, and in the krummholz zone (Giesen et al. 1980, p. 195; Wiebe and Martin 1998, p. 1139), usually with some lateral cover (Wilson and Martin 2008, pp. 635–636). Females select nest locations with an abundance of insects, especially leafhoppers (Cicadellidae), to meet the food requirements of their chicks (Spear et al. 2020, p. 182). Because incubating hens are at higher risk of predation and concealed nests are more successful, most females will choose some amount of nest cover but with good escape routes, rather than selecting sites with more cover (Wiebe and Martin 1998, p. 1142). Nest cover also provides protection from wind and mediates extreme temperature changes found in exposed nests; microclimate may determine nest site selection (Wiebe and Martin 1998, p. 1142).

As with breeding habitat, the lower elevation limit of post-breeding habitat is defined by treeline. In the Sierra Nevada, post-breeding habitat is associated with cover of dwarf willow and proximity to water (Frederick and Gutierrez 1992, p. 895). On Vancouver Island, post-breeding habitat is associated with topographic depressions where mesic vegetation cover is greatest (Fedy and Martin 2011, p. 311).

Post-breeding habitat in the Sierra Nevada is farther from snow than breeding season habitat, but snowmelt and glacial meltwater still provide the moisture that allows for the greater vegetation cover in sites selected by white-tailed ptarmigan (Frederick and Gutierrez 1992, p. 895). At high elevations, winter snowpack can store a significant portion of winter precipitation and release it to the soil during spring and early summer, thereby reducing the duration and magnitude of summer soil water deficits (Peterson et al. 2014, p. 26). At the basin scale, glacier melt supplies 2–14 percent of summer discharge in the Cascades and up to 28 percent of discharge by September (Frans et al. 2018, p. 11); the proportion is likely much greater in the high-elevation subbasins occupied by Mount Rainier white-tailed ptarmigan, which have a smaller catchment area to supply discharge from snow or rain.

A suitable microclimate is important for this cold-adapted bird. Because white-tailed ptarmigan have the lowest evaporative cooling efficiency of any bird (Johnson 1968, entire) and will pant at temperatures above 21 degrees C (70 degrees F), adults are likely limited by warm temperatures during the breeding and post-breeding seasons. Thermal behavioral adaptations include seeking cool microsites such as the edges of snowfields, near snowbanks, the shade of boulders, or near streams where temperatures are cool; the absence of these microsites may preclude presence of the species (Johnson 1968, p. 1012). Moist alpine meadows and large rocks or boulders appear to be consistently important post-breeding habitat features across several regions occupied by white-tailed ptarmigan (Frederick and Gutierrez 1992, p. 895; Hoffman 2006, p. 26).

No studies of Mount Rainier white-tailed ptarmigan use of winter habitat have been conducted. On Vancouver Island, wintering white-tailed ptarmigan have been found both above and below treeline in alpine bowls, hemlock and cedar forest on unvegetated rocky outcrops and cliffs, and (rarely) in clearcuts (Martin et al. 2015, Overwinter Habitat Section). Similarly, in southwestern Alberta, wintering white-tailed ptarmigan were found both above and below the treeline in alpine cirques and downslope of the cirques in subalpine and stream courses (Herzog 1980, p. 160). In the Rocky Mountains, wintering ptarmigan congregate in sexually segregated flocks in areas with soft snow and willows (Hoffman and Braun 1977, p. 110). Based on limited observations and the information from other subspecies, we expect wintering Mount Rainier white-tailed ptarmigan will use alpine areas, open areas in subalpine parklands, and openings created by stream courses, landslides, and avalanches within subalpine forests.

In the mountains of the Pacific Northwest, wind is responsible for much of the precipitation, which falls primarily as snow in the Cascades during the cooler months (October through March) (Peterson et al. 2014, p. 26). The Cascades have some of the deepest snowpack in North America, and in the winter, white-tailed ptarmigan thermally

shelter from wind and cold in snow roosts. Snow-roosting sites for Mount Rainier white-tailed ptarmigan have deep, fluffy snow with high insulation value; this generally means snow that is cold, relatively dry, and with abundant air spaces. Movement of snow by wind provides areas of banked snow for roosting sites (Luce 2019, p. 1363; Braun et al. 1976, p. 2; Braun and Schmidt 1971, p. 245). During the day when ptarmigan are not feeding, they seek shelter beneath or on the lee side of dwarf conifers growing along ridges, but snow on the ridges is often shallow and covered with a hard crust, making conditions unsuitable for night roosting. Thus, at dusk the birds move from ridges to areas of deeper and softer snow along treeline where they can burrow beneath the surface of the snow (Braun and Schmidt 1971, p. 245). When weather conditions are harsh, flocks will move below treeline to stream bottoms and avalanche paths (Braun et al. 1976, p. 4).

Wind in alpine areas also helps to keep ptarmigan habitat open by limiting vegetation height and the growth and stature of krummoltz trees (Zwinger and Willard 1972). Furthermore, wind on ridges maintains the exposure of dwarf willow bushes (usually less than approximately 1 m (3.3 ft) tall) at forage sites consistently used by ptarmigan throughout winter (Luce 2019, p. 1363; Braun et al. 1976, p. 2; Braun and Schmidt 1971, p. 245). Any larger willow stands similar to those relied on by southern white-tailed ptarmigan are likely buried by winter snows on the steep, high elevation range of Mount Rainier white-tailed ptarmigan (Schroeder 2019, pers. comm.) where disturbance by avalanches is frequent.

Historical and Current Distribution and Range

Though the AOU 1957 taxonomic classification of the subspecies delineated the range at the U.S.–Canada border, the best available information indicates that suitable habitat is contiguous across the border. Based on the combination of sightings, dispersal distance, and occurrence and distribution of suitable alpine and subalpine habitat, we

estimate that the range of the subspecies extends into British Columbia, Canada, to the Fraser Valley, which comprises the northern limit of the Northwestern Cascade Ranges Ecoregion and includes a portion of the Eastern Pacific Ranges Ecoregion of the North Cascades Ecoregion (Iachetti et al. 2006, no pagination). Exactly how far north into British Columbia the species' range extends is unknown, but we assume not farther north than approximately Lytton, British Columbia, east of the Fraser River in the Cascade Range due to a low-elevation gap in habitat and gap in occurrences in the Fraser Valley.

The historical range extended south along the Cascade Range to and including Mount St. Helens and Mount Adams. White-tailed ptarmigan regularly occurred on Mount St. Helens before the active volcano lost approximately 400 (m) (1,314 ft) of elevation when it erupted in 1980 (Brantley and Myers 1997, p. 2). Subsequent to the eruption, only three white-tailed ptarmigan occurrences were reported from that area, and none have been reported since 1996. Because the small amount of remaining alpine habitat is likely unsuitable, and it is unlikely that enough habitat will develop on Mount St. Helens to support a white-tailed ptarmigan population in the foreseeable future, the population is presumed extirpated. The subspecies did not historically inhabit mountainous areas south of Mount St. Helens and Mount Adams, primarily due to the lack of suitable alpine areas at those latitudes (approximately 46–45 degrees (Clarke and Johnston 2005, entire). Therefore, we consider the current range of the Mount Rainier white-tailed ptarmigan to include alpine and subalpine areas in the Cascade Mountains, extending from the southern edge of Mount Adams to Lytton, British Columbia, east of the Fraser River.

Land Ownership

Seventy-six percent of the range of Mount Rainier white-tailed ptarmigan is in the United States; approximately 24 percent of its range is in Canada. Almost all of its range in the United States is federally owned (Table 1). Two National Parks occur in the range

of Mount Rainier white-tailed ptarmigan: Mount Rainier and North Cascades. Three National Forests occur in the range of Mount Rainier white-tailed ptarmigan—Gifford Pinchot, Mt. Baker-Snoqualmie, and Okanogan-Wenatchee. The remaining nearly 6 percent of its range in the United States is under State, Tribal, or private ownership. Six percent of total suitable habitat for Mount Rainier white-tailed ptarmigan is located on land owned by British Columbia Provincial Parks (Chilliwack Lake Provincial Park, E.C. Manning Provincial Park, Cathedral Provincial Park, and Snowy Protected Area, Cathedral Protected Area) (BC–Parks 2020, entire).

Table 1. Land ownership in the range of Mount Rainier white-tailed ptarmigan in hectares (acres).

	Population Unit	Alpine Lakes	Goat Rocks	Mount Adams	Mount Rainier	North Cascades East	North Cascades West	William O. Douglas	Total	Percent Ownership
Federal	USFS	132,101 (326,429)	34,808 (86,012)	14,103 (34,849)	35,975 (88,897)	354,435 (875,827)	366,821 (906,435)	25,070 (61,949)	963,313 (2,380,397)	59
	NPS	0	0	0	55,917 (138,174)	18,860 (46,604)	139,639 (345,056)	0	214,417 (529,835)	13
	Other Federal	275 (680)	0	0	0	402 (993)	0	0	677 (1,673)	0.04
State		161 (398)	8,522 (21,058)	0	0	24,396 (60,283)	2,576 (6,364)	29 (71)	35,682 (88,173)	2
Tribal		0	17,940 (44,331)	8,087 (19,983)	0	0	0	0	26,027 (64,314)	2
Private/ Other		876 (2,166)	3,488 (8,619)	1,248 (3,084)	360 (889)	141 (348)	1,562 (3,860)	0	7,676 (18,969)	0.5
British Columbia	Provincial Parks	0	0	0	0	60,479 (149,448)	39,596 (97,845)	0	100,076 (247,292)	6
	Private/ Other	0	0	0	0	188,077 (464,748)	95,801 (236,730)	0	283,878 (701,477)	17
Total		133,414 (329,672)	64,758 (160,020)	23,438 (57,916)	92,252 (227,960)	646,788 (1,598,250)	645,995 (1,596,289)	25,100 (62,022)	1,631,746 (4,032,129)	

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an “endangered species” or a “threatened species.” The Act defines an endangered species as a species that is “in danger of extinction throughout all or a significant portion of its range,” and a threatened species as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act requires that we determine whether any species is an “endangered species” or a “threatened species” because of any of the following factors:

- (A) The present or threatened destruction, modification, or curtailment of its habitat or range;
- (B) Overutilization for commercial, recreational, scientific, or educational purposes;
- (C) Disease or predation;
- (D) The inadequacy of existing regulatory mechanisms; or
- (E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species’ continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term “threat” to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term “threat” includes actions or conditions that have a direct impact on individuals, as well as those that affect individuals through alteration of their habitat or required resources. The

term “threat” may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an “endangered species” or a “threatened species” only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

The Act does not define the term “foreseeable future,” which appears in the statutory definition of “threatened species.” Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term “foreseeable future” extends only so far into the future as the Service can reasonably determine that both the future threats and the species’ responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. “Reliable” does not mean “certain”; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and

commercial data available and should consider the timeframes applicable to the relevant threats and to the species' likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an assessment of the potential threats to the species. The SSA report does not represent a decision by the Service on whether the species should be proposed for listing as an endangered or threatened species under the Act. It does however, provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies. The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found on <http://www.regulations.gov> at Docket FWS-R1-ES-2020-0076.

To assess Mount Rainier white-tailed ptarmigan viability, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency supports the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years), redundancy supports the ability of the species to withstand catastrophic events (for example, droughts, large pollution events), and representation supports the ability of the species to adapt over time to long-term changes in the environment (for example, climate changes). In general, the more resilient and redundant a species is and the more representation it has, the more likely it is to sustain populations over time, even under changing environmental conditions. Using these principles, we identified the species' ecological requirements for survival and reproduction at the individual,

population, and species levels, and described the beneficial and risk factors influencing the species' viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated individual species' life-history needs. The next stage involved an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involved making predictions about the species' responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we used the best available information to characterize viability as the ability of a species to sustain populations in the wild over time. We use this information to inform our regulatory decision.

Analysis Units

Occurrence data is quite limited, and we do not know if the abundance of Mount Rainier white-tailed ptarmigan has changed over time. To facilitate the assessment of the current and projected future status of the subspecies across the range, we used the limited occurrence data and expert elicitation to delineate representation areas and population units. We separated the range into two representational areas, the North Area and the South Area, to represent the known ecological variation between the two regions. Within those two representational areas, we identified seven current population units based on observations, elevation, and vegetation types from Landfire vegetation maps (Table 2).

We refined the boundaries of these units by selecting vegetation types on recently refined National Park Service (NPS) vegetation maps and Landfire vegetation maps for U.S. Forest Service (USFS) lands. Our refined population unit maps contain nearly all observations of the species obtained from agency partners. One of the population units in the South Area, William O. Douglas, has suitable habitat but unknown occupancy. Another historical population in the South Area is considered extirpated due to the 1980

eruption of Mount Saint Helens volcano. We did not include the presumed extirpated Mount St. Helens population unit in our analysis of current or future condition because we conclude that it does not constitute suitable habitat now and is unlikely to in the foreseeable future.

Table 2. Number of Mount Rainier white-tailed ptarmigan observations by population unit.

Representation Area	Population Unit	Number of Observations
North	North Cascades–East	484
North	North Cascades–West	315
North	Alpine Lakes	98
South	Mount Rainier	289
South	William O. Douglas	0
South	Goat Rocks	4
South	Mount Adams	2

Summary of Biological Status and Threats

Factors Influencing the Status of the Species

The petition to list the southern and Mount Rainier white-tailed ptarmigan subspecies as threatened (CBD 2010, entire) identified the following influences as threats: effects to habitat from global climate change, recreation, livestock grazing, and mining; hunting; predation; inadequacy of regulatory mechanisms; population isolation or limited dispersal distances; and population growth rates and physiological response to a warming climate. Our 90-day finding on the petition (77 FR 33143, June 5, 2012) concluded that the petition and information in our files do not present substantial scientific or commercial information to indicate that listing may be warranted due to recreation, livestock grazing, mining, hunting, predation, inadequacy of regulatory mechanisms, population isolation, or limited dispersal distances. The 90-day finding concluded, however, that the petition presented substantial information to indicate that Mount Rainier white-tailed ptarmigan may warrant listing due to the effects of climate change on habitat and population growth rates, and the physiological response of the subspecies to a warming climate.

As part of our analysis of the viability of the Mount Rainier white-tailed

ptarmigan, we looked at the previously identified potential environmental and anthropogenic influences on viability, as well as any new ones identified since the publication of our 90-day finding. We analyzed population isolation and limited dispersal distances in the context of our resiliency, redundancy, and representation analysis for the subspecies. We also looked at the regulatory and voluntary conservation mechanisms that may reduce or ameliorate the effect of those stressors. To provide the necessary context for our discussion of the magnitude of each stressor, we first discuss our understanding of existing regulatory and voluntary conservation mechanisms.

Regulatory and Voluntary Conservation Mechanisms

A majority of the land (69 percent) within the national parks and forests in the U.S. portion of the range of Mount Rainier white-tailed ptarmigan is congressionally designated wilderness under 16 U.S.C. 551 and 18 U.S.C. 3559 and 3571. This designation bans roads along with the use of motorized and nonmotorized vehicles. In North Cascades National Park, 94 percent of the land is designated as the Steven Mather Wilderness (259,943 ha (642,333 ac) of the total 275,655 ha (681,159 ac)) (NPS 2020a, entire). There are 16 designated wilderness areas on U.S. Forest Service land in the range; the percentage of designated wilderness in each population unit is summarized below in Table 3. Additionally, 6 percent of the total suitable habitat for Mount Rainier white-tailed ptarmigan is located on land owned by British Columbia Provincial Parks (BC-Parks 2020, entire). Provincial parks are multiuse areas that contain some remote wilderness and allow activities such as hiking, camping, and winter recreation. The wilderness designation areas and Provincial Park lands in the range of Mount Rainier white-tailed ptarmigan are shown in Figure 1.

Table 3. Percent of area in U.S. designated wilderness by Mount Rainier white-tailed ptarmigan population unit.

Population Unit	Total hectares (acres)	Hectares (acres) in wilderness	Percent designated wilderness
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North Cascades–East (U.S. portion)	398,232 (984,054)	232,041 (573,387)	58
North Cascades–West (U.S. portion)	510,597 (1,261,715)	395,233 (976,642)	77
Alpine Lakes	133,414 (329,672)	98,104 (242,419)	74
Mount Rainier	92,252 (227,960)	81,937 (202,473)	89
William O. Douglas	25,100 (62,022)	19,455 (48,075)	78
Goat Rocks	64,758 (160,020)	25,395 (62,752)	39
Mount Adams	23,438 (57,916)	13,265 (32,779)	57
Total	1,247,792 (3,083,360)	865,432 (2,138,529)	69

Mount Rainier White-Tailed Ptarmigan Population Units and National Park Service, US Forest Service, BC Provincial Parks in Washington and British Columbia, Canada

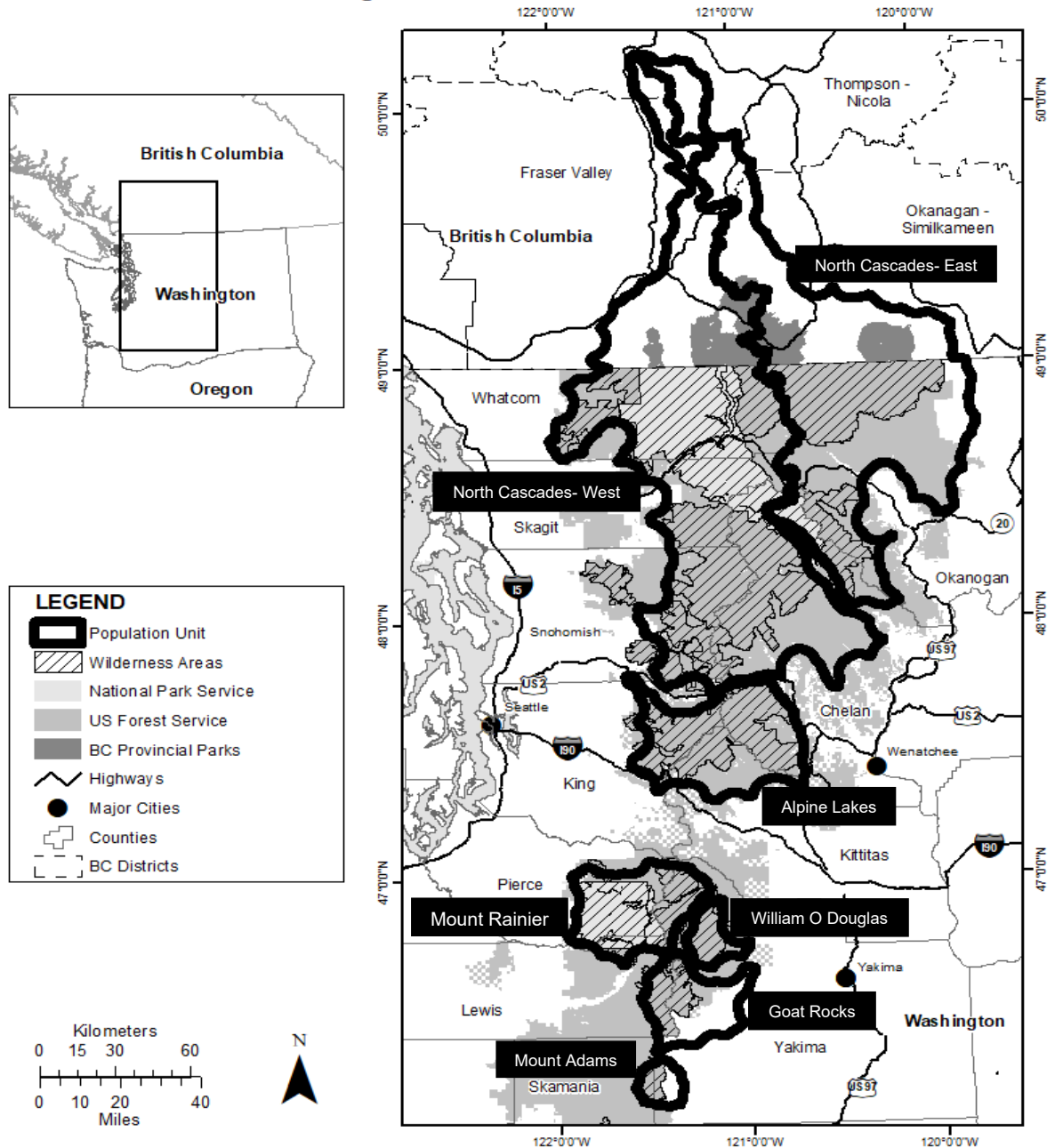


Figure 1. Mount Rainier white-tailed ptarmigan population units, land ownership, and designated wilderness areas in the range..

The Washington Department of Fish and Wildlife (WDFW) considers the white-tailed ptarmigan a game bird, but does not have a hunting season on the species. Take or possession of the species would be a violation under the Revised Code of Washington, section 77.15.400 (Washington State Legislature 2020, entire). Hunting of ptarmigan is

allowed in a relatively small portion of the Canadian portion of the North Cascades–West population unit from mid-September through mid-December (BC Canada 2020, entire).

White-tailed ptarmigan are a “Species of Greatest Conservation Need” in the State Wildlife Action Plan (WDFW 2015, pp. 3–18). The WDFW is making efforts to better understand the distribution and abundance of the species by soliciting observations from birding enthusiasts, hikers, backpackers, mountaineers, skiers, snowshoers, and other recreationists that visit ptarmigan habitat. The Transboundary Connectivity Project (Krosby et al. 2016, entire) included white-tailed ptarmigan as a focal species, and members created conceptual models of stressors to the species and designed strategies to abate threats.

Critical habitat for Canada lynx (*Lynx canadensis*) overlaps the range of Mount Rainier white-tailed ptarmigan in almost the entire North Cascades–East population unit, and about half of the North Cascades–West population unit (79 FR 54782, September 12, 2014). One of the identified physical and biological features essential to the conservation of Canada lynx is snow conditions (winter conditions that provide and maintain deep fluffy snow for extended periods in boreal forest landscapes). This critical habitat designation may provide some benefit to Mount Rainier white-tailed ptarmigan by regulating activities that are likely to adversely affect Canada lynx critical habitat within these population units.

White-tailed ptarmigan are not on the sensitive species list for USFS forests within the range of Mount Rainier white-tailed ptarmigan. Further, birds in the family *Phasianidae*, including white-tailed ptarmigan, are not protected in either the United States or Canada by the Migratory Bird Treaty Act (USFWS 2020b, p. 4). In Canada, with the exception of the Vancouver Island subspecies, white-tailed ptarmigan are listed as a G5 species (least concern) by the British Columbia Conservation Data Center.

Stressors

We analyzed a variety of stressors that potentially influence the current status of the Mount Rainier white-tailed ptarmigan or may influence the subspecies' future status. We again looked at all of the factors identified in the petition, as well as any potential new influences in the range of the subspecies. Neither the petition nor our 90-day finding identified disease as a threat, and we did not find information in our analysis to indicate that disease is currently, or likely to be in the future, a threat to the resiliency of any population unit or the overall viability of the subspecies. Our SSA concluded that the available information on several potential stressors, including mining, hunting, grazing and browsing, the invasive willow borer beetle (*Cryptorhynchus lapathi*), predation, and development and infrastructure indicated that these did not operate to a level affecting the resiliency of any population unit, or the overall viability of the subspecies (USFWS 2020, pp. 44–66). While the effects from recreation also appear to be limited to localized impacts on individuals, recreation is the primary human activity throughout the range of the subspecies and so we discuss it below in this rule along with the stressor of climate change. The effects of climate change are already evident in Mount Rainier white-tailed ptarmigan habitat, and the projected future increase in those effects may decrease the viability of the subspecies.

Recreation—The Cascade Mountain range in Washington is popular with outdoor enthusiasts, and Alpine Lakes, Goat Rocks, Mount Rainier National Park, Mount Adams, and North Cascades National Park are visited by recreationists throughout the year. For example, Alpine Lakes has an average of 150,000 visitors annually (USFS 2020a, entire), Mount Rainier National Park had approximately 1.5 million visitors in 2019, and North Cascades National Park drew 38,208 visitors in 2019 (NPS 2020a, entire). Recreation in alpine habitats includes activities associated with motorized recreation, such as the use of snowmobiles in the winter, and nonmotorized recreation throughout the year, such as hiking, backcountry camping, climbing, mountain biking, snowshoeing, and skiing.

While recreation in the alpine areas is largely confined to established routes on existing highways, roads, and trails, some recreationists will leave established roads or trails, either to temporarily access other areas or to establish unauthorized social trails.

In the winter, snowmobiles, snowcats, skiers (developed alpine/cross country and back country), and to a lesser extent snowshoers, may have direct effects on the fitness and survival of Mount Rainier white-tailed ptarmigan, the availability of forage plants, and the suitability of roosting sites (Braun et al. 1976, p. 8; Hoffman 2006, p. 44; Willard and Marr 1970, p. 257). These winter activities may also indirectly (1) induce stress and disturbance/dispersal in ptarmigan, (2) cause them to flush, exposing them to predation, or (3) discourage access to forage plants and snow roosting sites (which could impact subsequent fitness and reproductive success the next spring) (Braun et al. 1976, entire; Hoffman 2006, entire).

Outside of designated wilderness boundaries, there are 80 snowparks in Washington designated for snowmobile use (Washington State Parks 2020); a number of these occur in the range of Mount Rainier white-tailed ptarmigan though we do not have a measure of their footprint in the population units at this time. Snowmobiling is allowed only in a relatively small area in the corner of Mount Rainier National Park but is likely allowed in other areas throughout the range. Six developed ski areas are within the range of the subspecies. While the size and use of the developed ski areas have grown over time, and disturbance from developed ski areas is documented in related species, the six ski areas in the range of Mount Rainier white-tailed ptarmigan have all been in operation for more than 50 years and their collective skiable area makes up only 0.2 percent of the range of the species (Stevens Pass 2020, entire; Summit 2020, entire; Crystal Mountain 2020, entire; Manning 2020, entire; On the Snow 2020, entire; Heller 1980, entire; Meyers 2018, entire). Disturbance to individual Mount Rainier white-tailed ptarmigan in the vicinity of these ski areas may occur; however, it is unclear if any population units of

ptarmigan rely on these ski areas for winter habitat as they have been in operation for many decades. In general, the uncertainty surrounding the locations of Mount Rainier white-tailed ptarmigan winter-use areas limits our understanding of the scope and intensity of winter recreation activities on the subspecies.

Recreation on Federal lands as a whole has increased over time and is projected to continue to increase with future changes in human population and income (White et al. 2016, entire; Bowker and Askew 2012, entire). For recreation in the United States, developed skiing is projected to have the highest percentage potential national increase in total days of participation, with moderate increases in snowshoeing and cross-country skiing, and the least growth expected in motorized snow activities (White et al. 2016, entire; Bowker and Askew 2012, pp. 111–120). However, the best available information does not indicate that activities associated with winter recreation affect the resiliency of any population in the range of Mount Rainier white-tailed ptarmigan either currently or in the future.

In the spring, summer, and fall, day hikers, backpackers and backcountry campers and climbers, as well as mountain bikers in some areas, may recreate in areas suitable as breeding and postbreeding habitat for Mount Rainier white-tailed ptarmigan. Direct effects on ptarmigan from these activities may include mortality, temporary disturbance, temporary dispersal or permanent displacement from forage and shelter areas, as well as the destruction of individual nests (Braun et al. 1976, entire; Hoffman 2006, entire). Indirect effects may include trampling of habitat (therefore, reducing the quality or quantity of the habitat factors needed for feeding, breeding, and sheltering) as well as increased predation on ptarmigan due to an increase in predator levels from recreation-related food litter (see *Predation*, above) (Price 1985, p. 266; Crisfield et al. 2012, p. 279; Marion et al. 2016, p. 354; Martin and Butler 2017, p. 360; Hammett 1980, pp. 22–24).

Sensitive alpine soils may also erode or dry out following trampling and compaction from recreation, especially where it occurs away from roads and trails (Willard and Marr 1970, p. 257; Ebersole et al. 2004, p. 101). A plant's resistance to trampling varies with vegetation stature, growth form, and flexibility (Cole and Trull 1992, pp. 231–235). Some of the community types we expect ptarmigan to use are relatively resistant to trampling (e.g., *Carex*), while others are sensitive (e.g., *Phyllodoce*) (Cole and Trull 1992, pp. 231–235). In 1992, social trails resulted in significant damage in Paradise Park, an area of exceptionally high recreation use in Mount Rainier National Park (Rochefort and Gibbons 1992, p. 122). However, the area disturbed by trampling, social trails, and illegal campsites across the Mount Rainier white-tailed ptarmigan population analysis units has not been surveyed.

The temporary disturbance to wildlife from the presence of humans (and sometimes pet dogs and pack animals) may be reflected in behavioral reactions (i.e., fleeing or flushing), direct energetic costs, and elevated stress levels. Individual ptarmigan may return to an area after a temporary disturbance subsides; however, if enough individual Mount Rainier white-tailed ptarmigan experience temporary disturbance in an area, reductions in population vital rates, including survival and reproduction, would result. Repeated, prolonged, or concentrated disturbance of ptarmigan, or trampling or modification of areas they use, may permanently displace individuals; this would effectively result in habitat loss for the individual and, if experienced by enough individuals over a large enough area, for the population (Taylor and Knight 2003, p. 961; Ciuti et al. 2012, p. 9; Immitzer et al. 2014, pp. 177, 179; Tablado and Jenni 2017, p. 92; Seglund et al. 2018, pp. 90–91).

Reported disturbance and avoidance effects appear related to the type of activity on the trail. Unmanaged dogs may disturb, chase, and/or kill ptarmigan, as evidenced by an unleashed dog killing a southern white-tailed ptarmigan chick in Colorado (Seglund et

al. 2018, p. 91). Only leashed service dogs are allowed on trails in National Parks and some permit areas in National Forests like Enchantment Permit Area and Ingalls Lake area of Alpine Lakes Wilderness (NPS 2020b, entire; USFS 2020a, entire). Dogs on most National Forest lands including designated wilderness are only required to be leashed when in developed areas and on interpretive trails; on most USFS land, dogs are required to be under voice control or on a leash, but there is no explicit leash requirement for most of the lands in the USFS system (USFS 2020a, entire; USFS 2020b, entire). Studies of western capercaillie (Coppes et al. 2017, pp. 1589, 1592; Moss et al. 2014, p. 12) have shown higher levels of disturbance and avoidance of habitat in areas with sudden or unpredictable recreation, like mountain biking and horseback riding. They have also shown higher levels of disturbance and avoidance of habitat in areas with larger groups of people gathered, like areas close to restaurants, parking areas, and forest entrances. In contrast, in areas near hiking and walking trails, western capercaillie seemed to express a higher level of habituation to the presence of humans, even when people are accompanied by leashed dogs (Moss et al. 2014, p. 12).

One measure of the rate of summer recreation in alpine areas is the number of permitted backcountry campers (counting every person and night of each camping permit). The total number of backcountry campers in the four areas managed by the NPS in the range of the Mount Rainier white-tailed ptarmigan (Mount Rainier National Park, North Cascades National Park, Lake Chelan National Recreation Area, and Ross Lake National Recreation Area) has increased over time (Figure 2), but there is variability from year to year that is likely influenced by a variety of factors including population growth, the economy, and weather events, among others. Climbing is also a popular activity, particularly at Mount Rainier National Park. Mount Rainier summit attempts averaged 10,691 per year during the period 2008–2018, with 10,762 climbers in 2018 (NPS 2020c, entire). Nearly all climbing is conducted between mid-April and mid-September (Lofgren

and Ellis 2017, p. 8). A number of climbers camp overnight in the backcountry as part of their summit attempt, and we do not know whether the number of climbers are reflected in the number of backcountry campers reported for the Park.

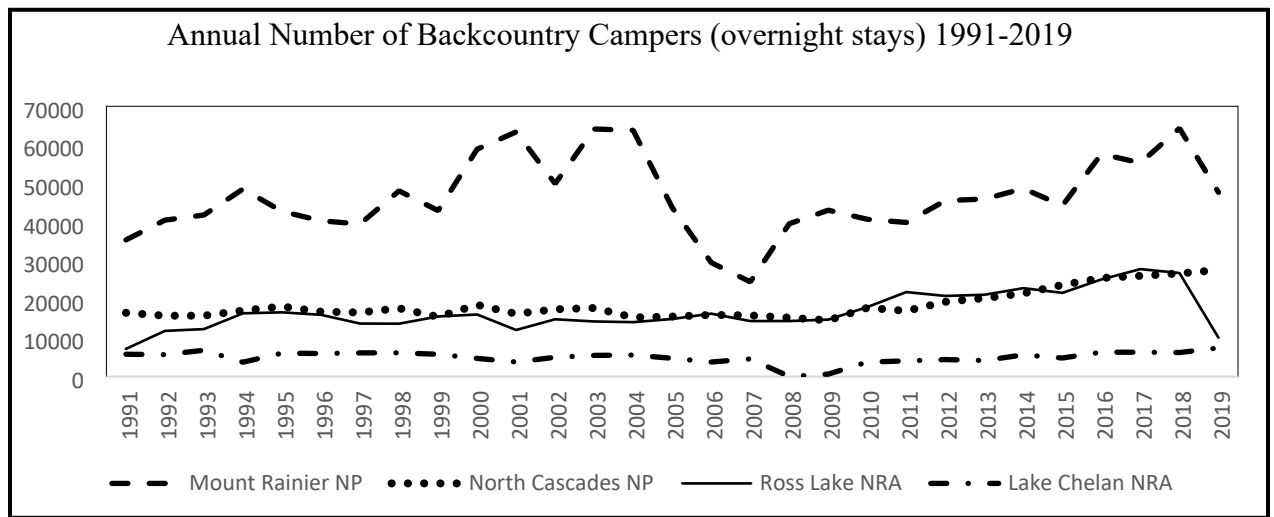


Figure 22. Annual number of backcountry campers (overnight stays) 1991–2019 (data from NPS 2020a, entire).

There are approximately 4,387 km (2,726.48 mi) of trails, unauthorized “social trails,” and climbing routes that have developed over time throughout the 1,631,746-ha (4,032,129-ac) range of Mount Rainier white-tailed ptarmigan. After dividing the area of trails in each population unit by the total hectares (acres) in the unit, we found the density of trails per unit ranges from a low of 0.01 percent in the North Cascades–East populations unit to a high of 0.07 percent in the Mount Adams population unit, with a total density of trails in the range of 0.02 percent. Reported disturbance and avoidance effects for similar species appear related to the type of activity on the trail, and most of the trail recreation in Mount Rainier white-tailed ptarmigan habitat is related to hiking, backpacking, and climbing rather than more disturbing sudden or unpredictable activities, like mountain biking or horseback riding. We do not know if individual ptarmigan in the range are disturbed by hikers to the point of abandoning habitat, or if they habituate to the presence of hikers (Moss et al. 2014, p. 12) and remain somewhere in the vicinity. Though the density of Mount Rainier white-tailed ptarmigan in proximity to any trail in

any unit is not available, the risk of potential exposure to hikers and the risk of trampling of habitat is likely concentrated in areas near specific high-use trails in the range.

Future recreation levels are projected to continue to increase with changes in human population and income, with moderate increases in day hiking and climbing, and the least growth expected in backpacking (White et al. 2016, entire; Bowker and Askew 2012, pp. 111–120), although it is difficult to predict to what extent any potential increase in recreation will impact the survival and reproduction of Mount Rainier white-tailed ptarmigan populations. Furthermore, many areas within the range are remote and difficult to access, so the distribution of current recreational use skews towards areas that are more accessible. We expect this tendency of recreationists to disproportionately use more accessible areas to continue in the future.

In summary, a wide array of recreation regularly occurs year-round within all Mount Rainier white-tailed ptarmigan population units. Although no published studies exist that directly link recreation to individual-level, population-level, or subspecies-level effects to the Mount Rainier white-tailed ptarmigan, effects to individual Mount Rainier white-tailed ptarmigan have been observed and studies have shown effects of higher intensity recreation on closely related species. However, the lack of information on historical abundance and distribution of Mount Rainier white-tailed ptarmigan made it difficult to assess the magnitude of impact that recreation has had to date on the subspecies. Further, the history of established recreation to date, the low density of trails, and the large percentage of protected wilderness in the range (69 percent of the range in the United States) all likely reduce the risk of exposure of this stressor to the subspecies. Based on the available information, recreation of any type or timing does not appear to currently affect any more than individual ptarmigan in localized areas. Although both established recreation in designated areas as well as recreation away from established roads and trails will likely increase in the future, available information does not indicate

that future increases in recreation would rise beyond individual-level impacts such that it is likely to affect subspecies redundancy or representation.

Climate change—The Intergovernmental Panel on Climate Change (IPCC) (2019, pp. 2–9) projects with very high confidence that surface air temperatures in high mountain areas will rise by 0.54 degrees F (0.3 degrees C) per decade, generally outpacing global warming rates regardless of future emission scenario. As temperatures increase, glaciers initially melt quickly and contribute an increased volume of water to the system, but as glacial mass is lost, their contribution of meltwater to the system decreases over time. Global climate models project declines in current glacier area throughout the Washington and northern Oregon Cascades (Frans et al. 2018, p. 13) that will result in a corresponding decline in associated snowpack and glacial melt contribution to summer discharge. Scenario RCP (Representation Concentration Pathway) 4.5 is a moderate emissions scenario, and RCP 8.5 is a high emissions scenario (Alder and Hostetler 2016, entire). In the North Cascades, glaciers are projected to retreat 92 percent between 1970 and 2100 under RCP 4.5, and 96 percent between 1970 and 2100 under RCP 8.5 (Gray 2019, p. 34).

The effects of climate change have already led to some glacial recession in Mount Rainier white-tailed ptarmigan habitat (Snover et al. 2013, pp. 2–3). Geologic mapping data, old maps and aerial photos, and recent inventories indicate that glacier area declined 56 percent in the North Cascades between 1900 and 2009 (Dick 2013, p. 59). On Mount Adams, total glacier area decreased by 49 percent from 1904 to 2006, at about 0.15 km² (0.06 mi²) per year (Sitts 2010, p. 384). Other individual glaciers in Washington have receded from 12 percent (Thunder Creek; 1950–2010) to 31 percent (Nisqually River; 1915–2009) (Frans et al. 2018, p. 10), and throughout the Cascades, glaciers continue to recede in both area and volume (Snover et al. 2013, pp. 2–3; Dick 2013, p. 59).

Glacier melt in many of the watersheds of the eastern Cascade Range and low-moderate elevation watersheds of the western Cascades has already peaked, or will peak in the current decade (Frans et al. 2018, p. 20). The variation in the timing of peak discharge from glacier to glacier will initially lead to decreases in available moisture to some alpine meadows, but increases in others. Later in the century, we expect all areas to suffer significant losses of glacier melt (Frans et. al 2018, p. 20). Total discharge in August and September from snowmelt, rain, and glacial melt in a sample of Cascades watersheds is already below the 1960–2010 mean and is expected to continue to drop through 2080 (Frans et. al 2018, p. 15). Glaciers on the east side of the Cascade crest, where the precipitation regime is drier, show the strongest response to climate in both historical and future time periods, and will be the most sensitive to a changing climate (Frans et al. 2018, p. 17).

Spring snowpack fluctuates substantially from year to year in Washington, but has declined overall by 30 percent from 1955 to 2016, and is expected to further decline by up to 38 percent under RCP 4RCP4.5 and up to 46 percent under RCP 8RCP8.5 by midcentury (Roop et al. 2019, p. 6). Changes in snowpack in the colder interior mountains will largely be driven by decreases in precipitation, while changes in snowpack in the warmer maritime mountains will be driven largely by increases in temperature (Hamlet et al. 2006, pp. 40–42). Although some high-elevation sites that maintain freezing winter temperatures may accumulate additional snowpack as additional winter precipitation falls as snow, overall, perennial snow cover is projected to decrease with climate change (Peterson et al. 2014, p. 25). A substantial decrease in perennial snow cover is projected for the North Cascades, with many areas of current snow cover replaced by bare ground (Patil et al. 2017, pp. 5600–5601).

Projected increases in air temperatures will also lead to changes in the quality of available snow through increases in rain on snow events and the refreezing of the surface

of snowpack that melted in the heat of the day. The refreezing of snow creates a hard surface crust (Peterson et al. 2014) that may make burrowing for roosting sites difficult for ptarmigan. Furthermore, warm winter temperatures create wet, heavy snow (Peterson et al. 2014), which is denser with less air space and therefore less suitable for snow roosts.

Reduced snowpack, earlier snowmelt, elimination of permanent snowfields, and higher evapotranspiration rates are likely to enhance summer soil drying and reduce soil water availability to alpine vegetation communities in the Cascades (Elsner et al. 2010, p. 245). As the climate becomes warmer, vegetation communities are also expected to shift their distributions to higher elevations. Globally, treelines have either risen or remained stable, with responses to recent warming varying among regions (Harsch et al. 2009, entire). Strong treeline advances have already been found in some areas of Washington, such as Mount Rainier National Park (Stueve et al. 2009, entire). As treeline rises at the lower limit of the alpine zone, upward expansion of the alpine zone will be constrained by cliffs, parent rock material, ice, remaining glaciers, permanent snow, and the top of mountain ranges. Where glaciers and permanent snow recede, primary succession will need to occur before the underlying parent material can support alpine meadows. Succession of the Lyman glacial forefront (the newly exposed area under a receding glacier) in the North Cascades took 20–50 years to develop early successional plant species.

Decreased winter wind associated with climate change may be contributing to observed declines in snowpack and stream flows (Luce et al. 2013, p. 1361). Continued decreases in wind are expected throughout the Cascades (Luce 2019, p. 1363), potentially decreasing the availability of forage for Mount Rainier white-tailed ptarmigan, as well as allowing some krummholz to grow taller into tree form, which can reduce the suitability of habitat. Decreased wind may reduce snowbanks and thereby limit the availability of

snow rooting sites for the subspecies, increasing the exposure of Mount Rainier white-tailed ptarmigan to temperatures below their tolerance in the winter. Delayed snowfall could also create plumage mismatch leading to increased predation. White-tailed ptarmigan are adapted to be cryptic through all seasons by changing plumages frequently to match the substrate as snow cover changes. A change in timing of molt, or timing of snow cover, could limit the effectiveness of this strategy (Riedell 2019, pers. comm.), leading to higher predation risk to individuals.

Climate change may affect Mount Rainier white-tailed ptarmigan through direct physiological effects on the birds such as increased exposure to heat in the summer. Mount Rainier white-tailed ptarmigan experience physiological stress when ambient temperatures exceed 21 degrees C (70 degrees F; Johnson 1968, p. 1012), so their survival during warmer months depends on access to cool microrefugia in their habitat; these cooler areas are created by boulders and meltwater near glaciers, permanent snowfields, snowbanks, and other areas of snow in alpine areas. The projected increases in temperature and related decreases in snowpack and meltwater will reduce the availability of these microrefugia in the foreseeable future to populations of Mount Rainier white-tailed ptarmigan

The timing of peak plant growth influences the availability of appropriate seasonal forage to ptarmigan, as well as the availability of insects. When the peak of plant abundance falls outside a crucial post-hatch period, the resulting phenological mismatch affects chick survival (Wann et al. 2019, entire). Projected effects of climate change could alter the growing season and abundance of the ptarmigan's preferred vegetation and the timing of the emergence and abundance of the insects necessary for foraging. If these changes result in significant asynchrony, populations of Mount Rainier white-tailed ptarmigan may not have adequate forage availability.

Where upslope migration of plant communities is able to occur in the face of climate change, habitat for white-tailed ptarmigan will still not be available unless or until primary succession proceeds to the stage where dwarf willows, sedges, and other ptarmigan forage species are present in sufficient abundance and composition to support foraging ptarmigan and insect populations for chicks. If it takes at least 20 years to develop limited white-tailed ptarmigan forage plants (*Saxifrage* species), and 70–100 years to mature to full habitat with lush meadows and ericaceous subshrubs, this would represent a gap in breeding and post-breeding habitat for 5 to 24 generations (assuming a generation length of 4.1 years) (Bird et al. 2020, supplement Table 4). Thus, we do not expect new habitat for the subspecies to be created at the same rate at which it is lost. Climate change will also convert subalpine forest openings (e.g., meadows) to subalpine forests, which are not suitable winter habitat for white-tailed ptarmigan. Infill of subalpine openings with trees has already occurred at Mount Rainier National Park (Stueve et al. 2009, entire). Subalpine tree species have increasingly filled in subalpine meadows throughout Northwestern North America (Fagre et al. 2003, p. 267).

In summary, the future condition of Mount Rainier white-tailed ptarmigan habitat will likely be affected by several factors associated with climate change including the following: exposure to heat stress (caused by increasing ambient temperatures coupled with decreasing availability of the cool summer refugia supplied by snow and glaciers); loss of winter snow roosts that protect ptarmigan from winter storms; changes in snow deposition patterns that may affect both snow roosts and forage availability; loss of alpine vegetation due to both hydrologic changes caused by decreases in meltwater from snowpack and glaciers as well as rising treelines; and phenological mismatch between ptarmigan hatch and forage availability. These changes are likely to impact the habitat at levels that measurably affect the resiliency of all populations. Although a reasonable projection of future population trend is limited by the lack of demographic data, the

projected degradation and loss of habitat, as well as likelihood of increased physiological stress of individuals across the range, would most certainly have negative effects on the future population growth rate of the subspecies. The scope and intensity of these combined effects is likely to affect the future resiliency of every extant population of Mount Rainier white-tailed ptarmigan and the redundancy and representation of those units across the range. Therefore, the effects of climate change are likely to affect the overall viability of the subspecies.

Summary of Factors Influencing the Status of the Species

We reviewed the environmental and anthropogenic factors that may influence the viability of Mount Rainier white-tailed ptarmigan, including regulatory and voluntary conservation measures and potential stressors. The subspecies is provided some measure of protection from the large amount of Federal management and congressionally designated wilderness in its range, the management of some of its range in Canada by British Columbia Provincial Parks, the subspecies' designation in Washington, and the overlap of its range with Canada lynx critical habitat.

The best available information does not indicate that disease has previously, is currently, or will in the future affect the resiliency of any Mount Rainier white-tailed ptarmigan population units. Although mining, hunting, grazing and browsing, the borer beetle, predation, development, and recreation may have localized effects to individual Mount Rainier white-tailed ptarmigan, the best available information does not suggest they affect the overall viability of the subspecies, and none are projected to increase in the future to a level that will affect the viability of the subspecies. However, the effects of climate change are already evident in Mount Rainier white-tailed ptarmigan habitat, and the projected future increase in those effects appears likely at a scope, magnitude, and intensity that will most certainly decrease the viability of the subspecies.

Current Condition

Based on our assessment of the biological information on the species, we identified 10 key resiliency attributes for populations of Mount Rainier white-tailed ptarmigan: (1) connectivity among seasonal use areas, (2) cool ambient summer temperatures, (3) a suitable hydrologic regime to support alpine vegetation, (4) winter snow quality and quantity, (5) abundance of forage, (6) cool microsites, (7) suitable population structure and recruitment, (8) adequate population size and dynamics, (9) total area of alpine breeding and postbreeding habitat, and (10) total area of winter habitat. We developed tables of these key population needs with one or more measurable indicators of each population need (USFWS 2020, p. 32).

To evaluate current condition, we took information for the current value of each indicator and assigned it to a condition category (USFWS 2020, pp. 60–86). We created condition categories based on what we consider an acceptable range of variation for the indicator based on our understanding of the species' biology and the need for human intervention to maintain the attribute (Conservation Measures Partnership 2013, entire) (Table 5). Categorical rankings were defined as follows:

Poor—Restoration of the population need is increasingly difficult (may result in loss of the local population);

Fair—Outside acceptable range of variation, requiring human intervention (this level would be associated with a decreasing population);

Good—Indicator within acceptable range of variation, with some intervention required for maintenance (this would be associated with a stable population);

Very Good—Ecologically desirable status, requiring little intervention for maintenance (this would be associated with a growing population).

Table 5. Metrics for both current and future condition indicator ratings for habitat attributes of Mount Rainier white-tailed ptarmigan.

Population Need	Indicator	Indicator Ratings Descriptions			
		Poor	Fair	Good	Very Good
Cool ambient temperatures in summer	Maximum summer temperature	>38 °C (100 °F)	21.1–38 °C (70.1–100 °F)	13.4–21 °C (56–70 °F)	7.3–13.3 °C (45–56 °F)
Cool ambient temperatures in summer	Number of days above 30 °C	>3	1 to 3	0–1	0
Hydrologic regime	Glacier melt (discharge normalized to 1960–2010 mean)	<0.5	0.5 to 0.75	>0.75 to 1	>1
Hydrologic regime	Snow water equivalent (April 1)	>2 standard deviation from historical mean	1–2 standard deviation from historical mean	<1 standard deviation from historical mean	Pre-1970 levels
Abundance of food resources	Distance to water during breeding season	>200 m	61–200 m	11–60 m	<10 m
Abundance of food resources	Soil moisture	>2 from standard deviation from historical mean	1–2 standard deviation from historical mean	<1 standard deviation from historical mean	Pre-1970 levels
Total area of modelled summer habitat	Area of alpine vegetation modelled from MC2	<7 sq km (1,730 ac)	1,731–4,000 ac	4,000–12,000 ac	>12,000 ac
Total area of modelled summer habitat	Area of alpine vegetation modelled from Bioclimatic Niche Models	<7 sq km (1,730 ac)	1,731–4,000 ac	4,000–12,000-ac	>12,000 ac

Eight additional indicators had data available for current condition, but we did not have models that allowed us to project them into the future so we did not use them to assess future condition. These additional indicators include connectivity between breeding, postbreeding, and winter habitat; area of willow, alder, or birch (winter forage); distance to water during breeding season; unvegetated area of glacial forefront (not colonized by forage plants yet, less is better); cover or distribution of large boulders (breeding and postbreeding seasons); a qualitative assessment of vegetation quality; mapped area of alpine vegetation from Landfire and NPS vegetation maps; and mapped area of subalpine vegetation from Landfire and NPS vegetation maps.

Current resiliency ratings are captured in Table 6. Redundancy is limited to six known extant population units in good or fair condition across the range of the subspecies. With respect to ecological variation, three extant populations occur in the South representation area and three extant populations occur in the North area. Although Mount Adams has poor landscape context due to large gaps in habitat limiting connectivity throughout the unit, and the condition is poor due to low quality of vegetation, the availability of microrefugia and summer habitat are very good, so the overall condition score of the population unit was scored as fair. The historical population at Mount Saint Helens was extirpated as a result of the volcanic explosion in 1980. The William O. Douglas Wilderness contains potential habitat, but we have no records of white-tailed ptarmigan in the area and consider occupancy unknown. Habitat for populations in the South Area is more limited and isolated than habitat for populations in the North. Observations on record and expert opinion indicate there are only a small number of birds in the Goat Rocks and Alpine Lakes population units in the South Area.

Table 6. Current condition for each occupied Mount Rainier white-tailed ptarmigan population. Note: landscape context describes the combined condition of connectivity, ambient temperature, hydrologic regime, and winter snow.

Representation	Population Unit	Condition Metrics	Resiliency
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Area		Landscape Context	Condition	(Habitat) Size	Rating
North	North Cascades–East	Good	Good	Fair	Good
North	North Cascades–West	Good	Fair	Very Good	Good
North	Alpine Lakes	Good	Fair	Fair	Fair
South	Mount Rainier	Good	Fair	Very Good	Good
South	Goat Rocks	Good	Fair	Fair	Fair
South	Mount Adams	Poor	Poor	Good	Fair

Future Condition

To better understand the projected future condition of Mount Rainier white-tailed ptarmigan, we developed four future scenarios based on global climate models at RCP 4.5 and RCP 8.5 to depict a range of potential outcomes for the subspecies’ habitat over time. These models were chosen because they frame the most likely high and low boundaries of future greenhouse gas emissions.

Projected changes in climate and related impacts can vary substantially across and within different regions of the world (IPCC 2007, pp. 8–12). Therefore, we use “downscaled” projections when they are available and are developed through appropriate scientific procedures, because such projections provide higher resolution information that is more relevant to spatial scales used for analyses of a given species (Glick et al. 2011, pp. 58–61). We used data obtained from the Northwest Climate Toolbox, developed by members of the Applied Climate Science Lab at the University of Idaho (Hegewisch and Abatzoglou 2019, entire). In addition to past and current data, the Northwest Climate Toolbox provides modeled future projections of climate and hydrology based on the effects of potential degrees of greenhouse gas emissions reported by the IPCC (IPCC 2014, entire). We evaluated the downscaled climate projections out to the middle of the century (2040–2069) (approximately 20–50 years from the present); after this timeframe, the projections from these two models diverge due to uncertainty (IPCC 2014, p. 59).

We estimated area of alpine vegetation from vegetation models based on the RCP 4.5 or RCP 8.5 scenarios (MC2 models) (Bachelet et al., 2017; Sheehan et al., 2015). We

also estimated area of alpine vegetation from biome climatic niche models based on three earlier global climate projections (CGCM3 1 A2 2090, Hadley A2 2090, and Consensus A2 2090). These models were used to project alpine area (and other vegetation type areas) for the Transboundary Connectivity Project (Krosby et al. 2016, entire, based on the projections supplied by Rehfeldt et al. 2012). Alpine area from the NPS and Landfire vegetation maps provides the most reliable and important measure of current population resiliency. We reported subalpine area for each analysis unit but did not use it as an indicator of future resilience because this measure does not differentiate between subalpine forests (which are not suitable for Mount Rainier white-tailed ptarmigan) and subalpine openings (suitable winter habitat). We also included a management variable in our scenarios to assess if specific management of recreation impacts and habitat enhancement and restoration would make a difference to the projected status of Mount Rainier white-tailed ptarmigan in the future.

The future scenarios we developed based on the climate-based vegetation models include:

- (1) Projected climate change effects under RCP 4.5 with no management for Mount Rainier white-tailed ptarmigan populations or habitat;
- (2) Projected climate change effects under RCP 8.5 with no management for Mount Rainier white-tailed ptarmigan populations or habitat;
- (3) Projected climate change effects under RCP 4.5 with management to maintain Mount Rainier white-tailed ptarmigan populations and habitat; and
- (4) Projected climate change effects under RCP 8.5 with management to maintain Mount Rainier white-tailed ptarmigan populations and habitat.

The scenarios demonstrated that the projected effects of climate change could result in the loss of up to 95 percent of the Mount Rainier white-tailed ptarmigan's currently available alpine tundra habitat (USFWS 2020, pp. 111–117, Appendix A), and

lead to a related decrease in the availability of thermal microrefugia for the subspecies. Although vegetation models yield different acreage projections, trajectories of both vegetation models and all scenarios are similar in indicating only one or two populations are likely to have any breeding season habitat remaining by 2069. Mount Rainier is consistently projected to be one of the remaining populations in all four future scenarios. The management actions (which include both reduced recreational impacts and habitat enhancement and restoration) are not projected to affect the status of any population unit in the GCM 4.5 scenario, and only projected to potentially benefit the North Cascades–West population unit in the GCM 8.5 scenario. Table 7 summarizes the future condition for all known currently extant population units.

Table 7. Future condition rating for each occupied Mount Rainier white-tailed ptarmigan population.

Representation Area	Population Unit	Current Condition	Future Condition			
			Scenario #1	Scenario #2	Scenario #3	Scenario #4
North	North Cascades–East	Good	Poor	Poor	Poor	Poor
North	North Cascades–West	Good	Poor	Poor	Poor	Fair
North	Alpine Lakes	Fair	Poor	Poor	Poor	Poor
South	Mount Rainier	Good	Good	Good	Good	Good
South	Goat Rocks	Fair	Poor	Poor	Poor	Poor
South	Mount Adams	Fair	Good	Fair	Good	Fair

Currently, population units of Mount Rainier white-tailed ptarmigan maintain fair to good resiliency across the range. Threats to white-tailed ptarmigan from the continuing effects of climate change include physiological stress due to elevated temperatures, reduced availability of moist alpine vegetation and associated insects, and loss of snow cover and reduction of snow quality for climate microrefugia and camouflage, and most importantly, loss of breeding and postbreeding habitat as a result of changes in precipitation, wind, and temperature. After developing four future scenarios based on downscaled climate and vegetation models, we found that Mount Rainier is the only

population unit in the range of the species projected to maintain good resiliency across all four future scenarios. Mount Adams is also projected to remain extant, though with less resiliency under RCP 8.5 model projections. Both of these units are in the South representation area; this area also includes Goat Rocks, but all four future scenarios predict poor resiliency of that population unit. The South representation area maintains much better future resiliency and redundancy than the North area. Resiliency of all three population units in the North area decreases to poor resiliency in all four future scenarios, with the exception of North Cascades–West, which will maintain fair resiliency in Scenario 4. Overall, the number of resilient population units will decrease in the future, reducing redundancy across the range. If population units in the North representation area decrease in resiliency to the point of extirpation, the ecological diversity present in the North representation area will be lost.

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have not only analyzed the various factors that have a population-level effect on the species, but we have also analyzed their potential cumulative effects. We incorporate the cumulative effects into our SSA analysis when we characterize the current and future condition of the species. Our assessment of the current and future conditions encompasses and incorporates an analysis of each threat on its own and cumulatively. Our current and future condition assessment is iterative because it accumulates and evaluates the effects of all the factors that may be influencing the resiliency of populations of the species, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative effects analysis.

Determination of Mount Rainier White-tailed Ptarmigan Status

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of an endangered species or a threatened species. The Act defines “endangered species” as a species “in danger of extinction throughout all or a significant portion of its range” and “threatened species” as a species “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act requires that we determine whether a species meets the definition of “endangered species” or “threatened species” because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) Overutilization for commercial, recreational, scientific, or educational purposes; (C) Disease or predation; (D) The inadequacy of existing regulatory mechanisms; or (E) Other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range

We evaluated threats to Mount Rainier white-tailed ptarmigan and assessed the cumulative effect of the threats under the section 4(a)(1) factors. The habitat-based stressors of climate change, mining, grazing, browsing, the invasive willow borer beetle, development, and recreation demonstrated varying degrees of localized effects to individual birds, but none of these stressors demonstrated effects to habitat at a level that is currently impacting the viability of the subspecies (Factor A). The best available information does not suggest that hunting (Factor B) or predation or disease (Factor C) are threats to Mount Rainier white-tailed ptarmigan. Habitat for the Mount Rainier white-tailed ptarmigan is currently supporting populations of the subspecies, and approximately 54 percent of the entire range is protected under wilderness designation from habitat loss resulting from development (Factor D). We also evaluated disturbance associated with recreation effects, but the best available information does not indicate any current effect

to the viability of the subspecies (Factor E). We further examined the current information available on demographics and distribution of the species as well as availability and quality of suitable habitat in the range. The best available information does not demonstrate any discernible trend for the condition (e.g., increasing, declining, or stable) of the known populations of Mount Rainier white-tailed ptarmigan. Overall, the subspecies currently exhibits adequate resiliency, redundancy, and representation. Thus, after assessing the best available information, we determined that the Mount Rainier white-tailed ptarmigan is not currently in danger of extinction throughout all of its range.

However, after assessing all the same stressors for future condition, we determined that habitat loss and degradation resulting from climate change will affect the Mount Rainier white-tailed ptarmigan within the foreseeable future. The level of predation, development, and recreation may increase in the future, but the best available information at this time does not indicate that they are reasonably likely to increase to a degree that will impact the viability of the subspecies within the foreseeable future. The large percentage of federally managed land (72 percent) and land designated as wilderness means the majority of the range is not at risk of future development.

Available information indicates that changing habitat conditions associated with future climate change, such as loss of alpine vegetation and reduced snow quality and quantity (Factor A), are expected to cause populations of Mount Rainier white-tailed ptarmigan to decline. Furthermore, rising temperatures associated with climate change are expected to have direct impacts on individual birds (Factor E), which experience physiological stress at temperatures above 21 degrees C (70 degrees F). In the North Cascades, glaciers are projected to retreat between 92 percent and 96 percent in the future. Glacier melt in many of the watersheds of the eastern Cascade Range and low-moderate elevation watersheds of the western Cascades has already peaked, or will peak in the current decade. Total discharge in August and September from snowmelt, rain, and

glacial melt in Cascades watersheds has notably declined and is expected to continue to drop through 2080. Spring snowpack in Washington has already declined overall by 30 percent from 1955 to 2016, and is expected to further decline from 38 to 46 percent by midcentury. The projected decreases in snowpack and glaciers and their associated meltwater, as well as changes in snow quality, decreasing wind, and advancing treeline and infill, could result in the loss of up to 95 percent of the Mount Rainier white-tailed ptarmigan's currently available alpine tundra habitat and a related loss in the availability of thermal microrefugia for the subspecies.

Within 50 years, the climate within available suitable Mount Rainier white-tailed ptarmigan habitat is expected to change significantly, such that the subspecies may remain at only one or two of the six current known extant population units, both of which are located in the South representation area. These threats and responses are reasonably foreseeable; notable glacial retreat has already occurred in the range due to warming temperatures, and the best available information does not indicate that the rate of climate change will slow within the foreseeable future. The maximum two populations projected to remain in 50 years are insufficient to support the Mount Rainier white-tailed ptarmigan's viability. Furthermore, connectivity between populations is currently low, and it is unlikely that Mount Rainier white-tailed ptarmigan will adapt to the changing climate by moving northward because alpine areas north of their current elevational range are expected to undergo similar impacts due to climate change. Future connectivity may be completely eliminated as the gaps between the populations expand, leaving the one or two extant populations isolated.

Thus, after assessing the best available information, we determined that the Mount Rainier white-tailed ptarmigan is likely to become in danger of extinction in the foreseeable future throughout all of its range.

Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. The court in *Center for Biological Diversity v. Everson*, 2020 WL 437289 (D.D.C. Jan. 28, 2020), vacated the aspect of the 2014 Significant Portion of its Range Policy that provided that the Services do not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range. Therefore, we proceed to evaluating whether the species is endangered in a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant, and (2) the species is in danger of extinction in that portion. Depending on the case, it might be more efficient for us to address the “significance” question or the “status” question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question we address, we do not need to evaluate the other question for that portion of the species' range.

Following the court's holding, we now consider whether there are any significant portions of the species' range where the species is in danger of extinction now (i.e., endangered). In undertaking this analysis for Mount Rainier white-tailed ptarmigan, we choose to address the status question first—we consider information pertaining to the geographic distribution of both the species and the threats that the species faces to identify any portions of the range where the species is endangered.

The statutory difference between an endangered species and a threatened species is the time horizon in which the species becomes in danger of extinction; an endangered species is in danger of extinction now while a threatened species is not in danger of extinction now but is likely to become so in the foreseeable future. Thus, we considered the time horizon for the threats that are driving the Mount Rainier white-tailed ptarmigan to warrant listing as a threatened species throughout all of its range. We examined the

following threats: predation, development, recreation, and the effects of climate change, including cumulative effects. While the effects of predation, development, and recreation on Mount Rainier white-tailed ptarmigan appear to be limited to localized impacts on individuals, the effects of climate change are already evident in Mount Rainier white-tailed ptarmigan habitat, and the projected future increase in those effects throughout the range will decrease the viability of the subspecies.

The best scientific and commercial data available indicate that the time horizon within which the Mount Rainier white-tailed ptarmigan will experience the effects of climate change is within the foreseeable future. Even though glaciers on the eastern side of the Cascades are receding at a faster rate than the glaciers on the western side, the rate of recession for the eastern glaciers is still not at a speed that puts the subspecies currently in danger of extinction. In addition, the best scientific and commercial data available do not indicate that the effects of climate change and the Mount Rainier white-tailed ptarmigan's responses to those effects are more immediate in any portions of the subspecies' range. Therefore, we determine that the Mount Rainier white-tailed ptarmigan is not in danger of extinction now in any portion of its range, but that the subspecies is likely to become in danger of extinction within the foreseeable future throughout all of its range. This is consistent with the courts' holdings in *Desert Survivors v. Department of the Interior*, No. 16-cv-01165-JCS, 2018 WL 4053447 (N.D. Cal. Aug. 24, 2018), and *Center for Biological Diversity v. Jewell*, 248 F. Supp. 3d, 946, 959 (D. Ariz. 2017).

Determination of Status

Our review of the best available scientific and commercial information indicates that the Mount Rainier white-tailed ptarmigan meets the definition of a threatened species. Therefore, we propose to list the Mount Rainier white-tailed ptarmigan as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness and conservation by Federal, State, Tribal, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and other countries and calls for recovery actions to be carried out for listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Subsection 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning consists of preparing draft and final recovery plans, beginning with the development of a recovery outline and making it available to the public within 30 days of a final listing determination. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery plan also identifies recovery criteria to review when a species may be ready for reclassification from endangered to threatened ("downlisting") or removal from protected

status (“delisting”) and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are sometimes established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our website (<http://www.fws.gov/endangered>), or from our Washington Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementing recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. Recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

If this subspecies is listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost-share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the State of Washington would be eligible for Federal funds to implement management actions that promote the protection or recovery of the Mount Rainier white-tailed ptarmigan. Information on our grant programs that are available to aid species recovery can be found at: <http://www.fws.gov/grants>.

Although the Mount Rainier white-tailed ptarmigan is only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery efforts for this subspecies. Additionally, we invite you to submit any new

information on this subspecies whenever it becomes available and any information you may have for potential recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

Federal agency actions within the species' habitat that may require conference or consultation or both as described in the preceding paragraph include management and any other landscape-altering activities on Federal lands administered by the USFS and NPS.

It is our policy, as published in the *Federal Register* on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing. The discussion below regarding protecting regulations under section 4(d) complies with our policy.

II. Proposed Rule Issued Under Section 4(d) of the Act

Background

Section 4(d) of the Act contains two sentences. The first sentence states that the “Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation” of species listed as threatened. The U.S. Supreme Court has noted that statutory language like “necessary and advisable” demonstrates a large degree of deference to the agency (see *Webster v. Doe*, 486 U.S. 592 (1988)). Conservation is defined in the Act to mean “the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the Act] are no longer necessary.” Additionally, the second sentence of section 4(d) of the Act states that the Secretary “may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants.” Thus, the combination of the two sentences of section 4(d) provides the Secretary with wide latitude of discretion to select and promulgate appropriate regulations tailored to the specific conservation needs of the threatened species. The second sentence grants particularly broad discretion to the Service when adopting the prohibitions under section 9.

The courts have recognized the extent of the Secretary’s discretion under this standard to develop rules that are appropriate for the conservation of a species. For example, courts have upheld rules developed under section 4(d) as a valid exercise of agency authority where they prohibited take of threatened wildlife, or include a limited taking prohibition (see *Alsea Valley Alliance v. Lautenbacher*, 2007 U.S. Dist. Lexis 60203 (D. Or. 2007); *Washington Environmental Council v. National Marine Fisheries Service*, 2002 U.S. Dist. Lexis 5432 (W.D. Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (see *State of Louisiana v. Verity*, 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history when the Act was

initially enacted, “once an animal is on the threatened list, the Secretary has an almost infinite number of options available to him with regard to the permitted activities for those species. He may, for example, permit taking, but not importation of such species, or he may choose to forbid both taking and importation but allow the transportation of such species” (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Exercising this authority under section 4(d), we have developed a proposed rule that is designed to address the specific threats to and conservation needs of Mount Rainier white-tailed ptarmigan. Although the statute does not require us to make a “necessary and advisable” finding with respect to the adoption of specific prohibitions under section 9, we find that this rule as a whole satisfies the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of Mount Rainier white-tailed ptarmigan. As discussed under **Summary of Biological Status and Threats**, we have concluded that the Mount Rainier white-tailed ptarmigan is likely to become in danger of extinction within the foreseeable future solely due to the projected effects of climate change, especially increasing temperatures and a loss of the conditions that support suitable alpine habitat.

The proposed 4(d) rule was developed considering our understanding of the Mount Rainier white-tailed ptarmigan’s physical and biological needs, which in large part relies upon information from other white-tailed ptarmigan subspecies. Though there is some information on the subspecies’ habitat, the majority of habitat and demographic information comes from other subspecies (particularly the southern white-tailed ptarmigan in Colorado where there is considerable habitat connectivity and a very different climate). Given the unique aspects of the landscape and climate in the Cascades, significant uncertainty remains regarding Mount Rainier white-tailed ptarmigan’s specific needs and how and to what degree stressors are operating in the subspecies’ habitat. For example, we do not specifically understand Mount Rainier white-tailed ptarmigan’s

winter habitat requirements, its winter food resources, or its reliance on snow roosting. We do not understand why some areas of apparently suitable habitat lack observational records of the subspecies. We also lack the demographic information necessary to understand to what degree the subspecies is at risk in the future from various forms of disturbance.

Considering these uncertainties and our requirement to develop a recovery plan for the Mount Rainier white-tailed ptarmigan if the proposed listing rule is finalized, our proposed 4(d) rule is designed to promote its conservation by facilitating the viability of current populations, scientific study of the subspecies, and conservation and restoration of its habitat. Further, our proposed 4(d) rule will allow our Federal partners to continue routine operations on the landscape that are not likely to cause adverse effects and, in some cases, have the potential to benefit the Mount Rainier white-tailed ptarmigan over time. As we learn more about the Mount Rainier white-tailed ptarmigan and its habitat, we will refine our conservation recommendations for the subspecies. The provisions of this proposed 4(d) rule are one of many tools that we would use to promote the conservation of Mount Rainier white-tailed ptarmigan. This proposed 4(d) rule would apply only if and when we make final the listing of Mount Rainier white-tailed ptarmigan as a threatened subspecies.

Provisions of the Proposed 4(d) Rule

This proposed 4(d) rule would provide for the conservation of the Mount Rainier white-tailed ptarmigan by prohibiting its take, except as otherwise authorized or permitted. Mount Rainier white-tailed ptarmigan is in danger of extinction in the foreseeable future due to the projected effects of climate change. The prohibition of take will support the conservation of existing populations of the subspecies by facilitating their viability in the face of these projected environmental changes. Excepting the following specific take mechanisms from this prohibition under the Act will allow for the

continued management of land in the range in a manner that does not impact the viability of the subspecies:

- Take that is incidental to facilitating human safety such as rescue and fire and other emergency response. During emergency events, the primary objective of the responding agency must be to protect human life and property and this objective takes precedence over considerations for minimizing adverse effects to the Mount Rainier white-tailed ptarmigan.

- Take by authorized law enforcement officers and other wildlife professionals in the course of their official duties that is incidental to aiding or euthanizing sick, injured, or orphaned Mount Rainier white-tailed ptarmigan; disposing of dead specimens; and salvaging a dead specimen that may be used for scientific study. These activities are not likely to cause adverse effects to populations and have the potential to benefit the subspecies over time.

- Take that is incidental to currently (at the time this rule becomes effective) lawfully conducted outdoor recreational activities such as hiking (including associated authorized pack animals and domestic dogs handled in compliance with existing regulations), camping, backcountry skiing, mountain biking, snowmobiling, climbing, and hunting where these activities are permitted. Based on available information, these types of permitted activities have the potential to disturb individual ptarmigan in localized areas representing a very small portion of the available habitat in the subspecies' range.

- Take that is incidental to habitat restoration actions with the primary purpose of conserving Mount Rainier white-tailed ptarmigan or enhancing its habitat, provided that reasonable care is taken to minimize such take. Activities associated with habitat restoration (e.g., weeding, planting native forage plants, and establishing watering areas) are likely to cause only short-term, temporary adverse effects, especially in the form of

harassment or disturbance of individual ptarmigan. In the long term, the risk of these effects to both individuals and populations is expected to be mitigated as these types of activities will likely benefit the subspecies by helping to preserve and enhance the habitat of existing populations over time. Reasonable care for habitat management may include, but would not be limited to, procuring and implementing technical assistance from a qualified biologist on habitat management activities, and best efforts to minimize Mount Rainier white-tailed ptarmigan exposure to hazards (e.g., predation, habituation to feeding, entanglement, etc.).

- Take that is incidental to conducting lawful control of predators of Mount Rainier white-tailed ptarmigan. Currently, predators of Mount Rainier white-tailed ptarmigan are not managed within the range of the subspecies, and predation is not a threat to the viability of the subspecies. However, ptarmigan are threatened in the foreseeable future by climate change and the persistence of the subspecies will rely on the conservation of existing populations, so future predator control may be authorized by the Service for the purposes of conservation of the Mount Rainier white-tailed ptarmigan. Therefore, take of Mount Rainier white-tailed ptarmigan associated with predator control authorized in advance by the Service would be not be prohibited, as the benefit to the subspecies from this activity outweighs the risk to individual ptarmigan.

- Take that is incidental to lawfully conducted timber harvest or forest management activities. White-tailed ptarmigan are rarely found using forested habitat types across the entire range of the species, and instead prefer alpine areas, open areas in subalpine parklands, and openings within subalpine forests, demonstrating a preference for habitat with few or no trees. Forest management activities in proximity to ptarmigan habitat may cause short-term, temporary adverse effects, especially in the form of harassment or disturbance of individual ptarmigan using habitats adjacent to forested

areas; however, in the long term, these activities may benefit the subspecies by reducing the risk of wildfire near ptarmigan habitat.

- Take that is incidental to the maintenance of any currently existing public or private infrastructure within or adjacent to Mount Rainier white-tailed ptarmigan habitat, including existing trails and supporting infrastructure. Most existing development and infrastructure within the range of Mount Rainier white-tailed ptarmigan, the largest of which is associated with Mount Rainier National Park, has been in place for decades or longer. The amount of land developed for existing roads, buildings, trail head facilities and parking lots, trails, benches, signs, safety features, designated camping sites, developed ski areas, and helicopter landing pads is a very small percentage of the subspecies' range, and available suitable habitat is abundant and remote. As with outdoor recreation activities, the maintenance of existing trails and infrastructure within the subspecies' range has the potential to temporarily disturb individual ptarmigan in localized areas. The best available information does not indicate that these types of routine maintenance would put the viability of the subspecies at risk.

As discussed under **Summary of Biological Status and Threats** (above), increasing temperatures (Factor E) and a loss of the conditions that support suitable alpine habitat (Factor A) are driving the status of Mount Rainier white-tailed ptarmigan. However, a range of current and potential activities could directly and indirectly impact Mount Rainier white-tailed ptarmigan via direct take or loss of habitat. These activities may cause disturbance, harm, or mortality to individual ptarmigan, trampling of habitat, introduction of invasive species in habitat, and loss of habitat. These activities include but are not limited to: trail construction, maintenance, and use; road maintenance and repair; ski area development and/or expansion; helicopter landing pad development and/or expansion; recreation activities in alpine areas in summer, or subalpine areas in winter (e.g., hiking, snowmobiling, skiing, heli-skiing, cross-country skiing, snowshoeing,

climbing, etc.); presence of dogs associated with recreation; use of pack animals in alpine areas; emergency response actions; and activities that may involve soil disturbance or alter the pattern and depth of snow in ptarmigan winter use areas. The best available information does not indicate that any of these activities, conducted in accordance with the law, put the viability of Mount Rainier white-tailed ptarmigan at risk. Allowing the continuation of these activities while prohibiting all other forms of take will facilitate Federal agencies in managing their land according to their priorities without unnecessary regulation while still supporting the conservation of the subspecies.

Under the Act, “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Some of these provisions have been further defined in regulation at 50 CFR 17.3. Take can result knowingly or otherwise, by direct and indirect impacts, intentionally or incidentally. Regulating incidental and intentional take would help preserve the subspecies’ remaining populations and encouraging habitat restoration and enhancement could help decrease the negative effects from climate change, as well as the synergistic effects from other threats to individuals of the subspecies.

We may issue permits to carry out otherwise prohibited activities, including those described above, involving threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32. Regarding threatened wildlife, a permit may be issued for the following purposes: scientific purposes, to enhance propagation or survival, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for special purposes consistent with the purposes of the Act. There are also certain statutory exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

We recognize the special and unique relationship with our State natural resource agency partners in contributing to conservation of listed species. State agencies often

possess scientific data and valuable expertise on the status and distribution of endangered, threatened, and candidate species of wildlife and plants. State agencies, because of their authorities and their close working relationships with local governments and landowners, are in a unique position to assist the Services in implementing all aspects of the Act. In this regard, section 6 of the Act provides that the Services shall cooperate to the maximum extent practicable with the States in carrying out programs authorized by the Act. Therefore, any qualified employee or agent of a State conservation agency that is a party to a cooperative agreement with the Service in accordance with section 6(c) of the Act, who is designated by his or her agency for such purposes, would be able to conduct activities designed to conserve Mount Rainier white-tailed ptarmigan that may result in otherwise prohibited take without additional authorization.

Nothing in this proposed 4(d) rule would change in any way the recovery planning provisions of section 4(f) of the Act, the consultation requirements under section 7 of the Act, or the ability of the Service to enter into partnerships for the management and protection of Mount Rainier white-tailed ptarmigan. However, interagency cooperation may be further streamlined through planned programmatic consultations for the species between Federal agencies and the Service, where appropriate. We ask the public, particularly State agencies and other interested stakeholders that may be affected by the proposed 4(d) rule, to provide comments and suggestions regarding additional guidance and methods that the Service could provide or use, respectively, to streamline the implementation of this proposed 4(d) rule (see **Information Requested**).

III. Critical Habitat

Background

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species, and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Our regulations at 50 CFR 424.02 define the geographical area occupied by the species as an area that may generally be delineated around species' occurrences, as determined by the Secretary (i.e., range). Such areas may include those areas used throughout all or part of the species' life cycle, even if not used on a regular basis (e.g., migratory corridors, seasonal habitats, and habitats used periodically, but not solely by vagrant individuals).

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that Federal agencies ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land

ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Designation also does not allow the government or public to access private lands, nor does designation require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the Federal agency would be required to consult with the Service under section 7(a)(2) of the Act. However, even if the Service were to conclude that the proposed activity would result in destruction or adverse modification of the critical habitat, the Federal action agency and the landowner are not required to abandon the proposed activity, or to restore or recover the species; instead, they must implement “reasonable and prudent alternatives” to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act’s definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat). In identifying those physical or biological features that occur in specific occupied areas, we focus on the specific features that are essential to support the life-history needs of the species, including but not limited to, water characteristics, soil type, geological features, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic, or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also

be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity.

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. When designating critical habitat, the Secretary will first evaluate areas occupied by the species. The Secretary will only consider unoccupied areas to be essential where a critical habitat designation limited to geographical areas occupied by the species would be inadequate to ensure the conservation of the species. In addition, for an unoccupied area to be considered essential, the Secretary must determine that there is a reasonable certainty both that the area will contribute to the conservation of the species and that the area contains one or more of those physical or biological features essential to the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the *Federal Register* on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106-554; H.R. 5658)), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

Prudency Determination

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, the Secretary

shall designate critical habitat at the time the species is determined to be an endangered or threatened species. Our regulations (50 CFR 424.12(a)(1)) state that the Secretary may, but is not required to, determine that a designation would not be prudent in the following circumstances:

(i) The species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat to the species;

(ii) The present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or threats to the species' habitat stem solely from causes that cannot be addressed through management actions resulting from consultations under section 7(a)(2) of the Act;

(iii) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States;

(iv) No areas meet the definition of critical habitat; or

(v) The Secretary otherwise determines that designation of critical habitat would not be prudent based on the best scientific data available.

We identified threats to Mount Rainier white-tailed ptarmigan habitat by looking at the negative effects of an action or condition (stressor) in light of the exposure, timing, and scale at the individual, population, and species levels, as called for in the SSA framework (USFWS 2016, entire). We analyzed the stressors that demonstrate current or potential future negative effects to individuals, to determine which of those stressors operate, or are projected to operate, at a scope and intensity as to influence the resiliency of populations and thereby the overall viability of Mount Rainier white-tailed ptarmigan. This approach is consistent with direction provided in the definition of critical habitat in section 3 of the Act which refers to "specific areas...essential to the conservation of the species." Through our viability analysis, we determined that no stressor is currently

impacting the viability of the subspecies. However, changing habitat conditions associated with future climate change, such as loss of alpine vegetation and reduced snow quality and quantity, are expected to cause populations of Mount Rainier white-tailed ptarmigan to decline within the foreseeable future, threatening the future condition and, in turn, the overall viability of the subspecies.

Mount Rainier white-tailed ptarmigan rely heavily on thermal microrefugia created by boulders and meltwater near glaciers, permanent snowfields, snowbanks, and other areas of snow in alpine areas, to help maintain safe body temperature in both summer and winter. They also rely heavily on the availability of moist forage vegetation. In the North Cascades, glaciers are projected to retreat between 92 percent and 96 percent in the future. Glacier melt in many of the watersheds of the eastern Cascade Range and low-moderate elevation watersheds of the western Cascades has already peaked, or will peak in the current decade. Total discharge in August and September from snowmelt, rain, and glacial melt in Cascades watersheds has notably declined and is expected to continue to drop through 2080. Spring snowpack in Washington has already declined overall by 30 percent from 1955 to 2016, and is expected to further decline midcentury from 38 to 46 percent by midcentury. The projected decreases in snowpack and glaciers and their associated meltwater, as well as changes in snow quality, decreasing wind, and advancing treeline and infill, is likely to result in the loss of up to 95 percent of the Mount Rainier white-tailed ptarmigan's currently available alpine tundra habitat and a related loss in the availability of thermal microrefugia for the subspecies. There are no management actions resulting from consultations under section 7(a)(2) of the Act that could address the impacts of climate change on the habitat and microrefugia that support this subspecies (see the Service's May 14, 2008, Director's Memo on Expectations for Consultations on Actions that Would Emit Greenhouse Gases, which notes that section 7 consultation would not be required to address impacts of a facility's greenhouse gas

emissions). Based on the best available science, we find that threats to Mount Rainier white-tailed ptarmigan habitat stem solely from causes that cannot be addressed through management actions resulting from consultations on this subspecies under section 7(a)(2) of the Act. Therefore, in accordance with 50 CFR 424.12(a)(1), we determine that designation of critical habitat is not prudent for Mount Rainier white-tailed ptarmigan.

Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

- (1) Be logically organized;
- (2) Use the active voice to address readers directly;
- (3) Use clear language rather than jargon;
- (4) Be divided into short sections and sentences; and
- (5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses pursuant to the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) in connection with regulations adopted pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the *Federal Register* on October 25, 1983 (48 FR 49244). This

position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County v. Babbitt*, 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996) *Government-to-Government Relationship with Tribes*

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. All potentially affected Tribes were sent a letter highlighting our assessment of this subspecies and requesting information about the subspecies or other feedback. We did not receive any replies. We will continue to work with Tribal entities as we develop a final rule for the listing of Mount Rainier white-tailed ptarmigan.

References Cited

A complete list of references cited in this rulemaking is available on the Internet at <http://www.regulations.gov> and upon request from the Washington Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this proposed rule are the staff members of the Fish and Wildlife Service's Species Assessment Team and the Washington Fish and Wildlife Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

AUTHORITY: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

2. Amend § 17.11(h) by adding an entry for “Ptarmigan, Mount Rainier white-tailed” to the List of Endangered and Threatened Wildlife in alphabetical order under BIRDS to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where Listed	Status	Listing Citations and Applicable Rules
* * * * *	* * *			
BIRDS				
* * * * *	* * *			
Ptarmigan, Mount Rainier white-tailed	<i>Lagopus leucura rainierensis</i>	Wherever found	T	[<i>Federal Register</i> citation when published as a final rule]; 50 CFR 17.41(i); ^{4d} .
* * * * *	* * *			

3. Amend § 17.41 by adding paragraph (i) to read as follows:

§ 17.41 Special rules—birds.

* * * * *

(i) Mount Rainier white-tailed ptarmigan (*Lagopus leucura rainierensis*).

(1) *Prohibitions.* The following prohibitions that apply to endangered wildlife also apply to Mount Rainier white-tailed ptarmigan. Except as provided under paragraph (i)(2) of this section and § 17.4, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or cause to be committed, take of this subspecies, as set forth at § 17.21(c)(1) for endangered wildlife.

(2) *Exceptions from prohibitions.* In regard to this subspecies, you may:

(i) Conduct activities as authorized by a permit under § 17.32.

(ii) Take, as set forth at § 17.21(c)(2) through (5) for endangered wildlife.

(iii) Take, as set forth at § 17.31(b).

(iv) Take incidental to an otherwise lawful activity in accordance with these provisions:

(A) *Human safety and emergency response.* A person may incidentally take Mount Rainier white-tailed ptarmigan in the course of carrying out official emergency response activities related to human safety and the protection of natural resources.

(B) *Law enforcement and on-the-job wildlife professionals.* When acting in the course of their official duties, State and local law enforcement officers and other wildlife professionals, working in conjunction with authorized wildlife biologists and wildlife rehabilitators in the State of Washington, may take Mount Rainier white-tailed ptarmigan for the following purposes:

(1) Aiding or euthanizing sick, injured, or orphaned ptarmigan;

(2) Disposing of a dead specimen;

(3) Salvaging a dead specimen that may be used for scientific study; or

(4) Possession and other acts with unlawfully taken specimens as provided in § 17.21(d)(2) for endangered wildlife.

(C) *Lawful outdoor recreation.* A person may incidentally take Mount Rainier white-tailed ptarmigan in the course of carrying out outdoor recreational activities, such as hiking (including associated authorized pack animals and domestic dogs handled in compliance with existing regulations), camping, backcountry skiing, mountain biking, snowmobiling, climbing, and hunting, that are lawful as of [EFFECTIVE DATE OF THE FINAL RULE].

(D) *Habitat restoration actions.* A person may incidentally take Mount Rainier white-tailed ptarmigan in the course of carrying out authorized habitat restoration consistent with the conservation needs of Mount Rainier white-tailed ptarmigan. Habitat restoration and enhancement activities for the conservation of Mount Rainier white-tailed ptarmigan may include activities consistent with formal approved conservation plans or strategies, such as Federal or State plans and documents that include ptarmigan conservation prescriptions or compliance, which the Service has determined would be consistent with this rule.

(E) *Predator control.* A person may incidentally take Mount Rainier white-tailed ptarmigan in the course of carrying out predator control for the purpose of Mount Rainier white-tailed ptarmigan conservation if reasonable care is practiced to minimize effects to Mount Rainier white-tailed ptarmigan. Predator control activities may include the use of fencing, trapping, shooting, and toxicants to control predators, and related activities such as performing efficacy surveys, trap checks, and maintenance duties. Any predator control conducted for the purposes of conservation of Mount Rainier white-tailed ptarmigan must be authorized in advance by the Service.

(F) *Forest management.* A person may incidentally take Mount Rainier white-tailed ptarmigan in the course of carrying out legal and authorized forest management activities, including but not limited to: timber harvest, fire management, and thinning.

(G) *Routine maintenance to existing trails and infrastructure.* A person may incidentally take Mount Rainier white-tailed ptarmigan in the course of carrying out authorized routine maintenance of currently existing trails, public or private infrastructure (e.g., buildings, roads, parking lots, viewpoints, trails, and camp sites) and supporting infrastructure (e.g., benches, signs, safety features) within or adjacent to Mount Rainier white-tailed ptarmigan habitat.

(H) *Reporting and disposal requirements.* Any injury or mortality of Mount Rainier white-tailed ptarmigan associated with the actions excepted under paragraphs (i)(2)(iv)(A) through (C) of this section must be reported to the Service and authorized State wildlife officials within 72 hours, and specimens may be disposed of only in accordance with directions from the Service. Reports should be made to the Service's Office of Law Enforcement; contact info for that office is located at 50 CFR 10.22.

Martha Williams

Principal Deputy Director

Exercising the Delegated Authority of the Director

U.S. Fish and Wildlife Service